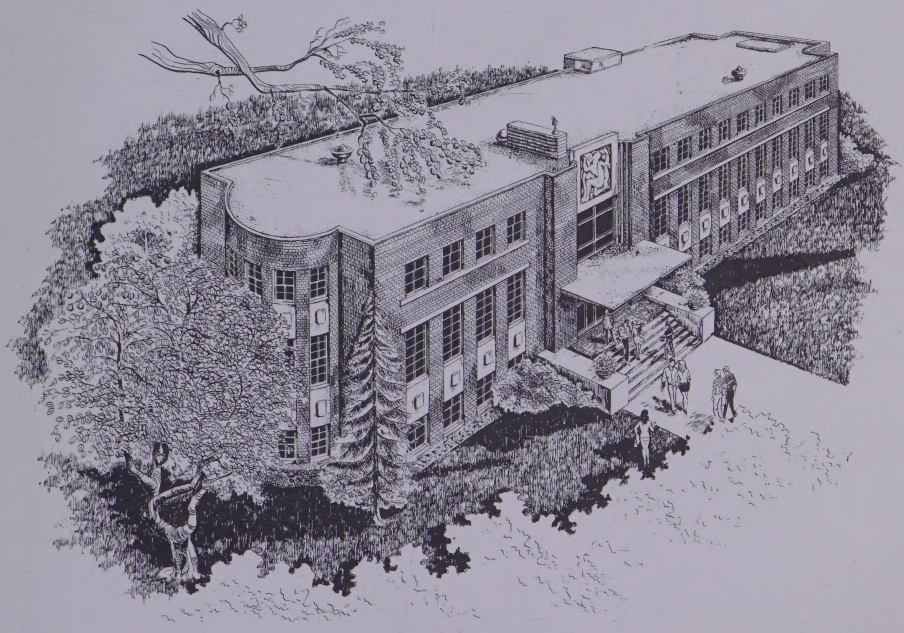
*The University of Alberta*
*Printing Department*
*Edmonton, Alberta*

# *The University of Alberta*

*Sixty-first Session*

# Calendar 1968-69



*University Hall.*

*Edmonton, Alberta*

## *Please Note*

(1) As this Calendar is published a considerable time before the opening of the Session, the University reserves the right to make whatever changes circumstances may require, including the cancellation of particular courses.

(2) Inquiries should be directed as follows:

*On academic matters*—The Dean or Director of the appropriate faculty or school.

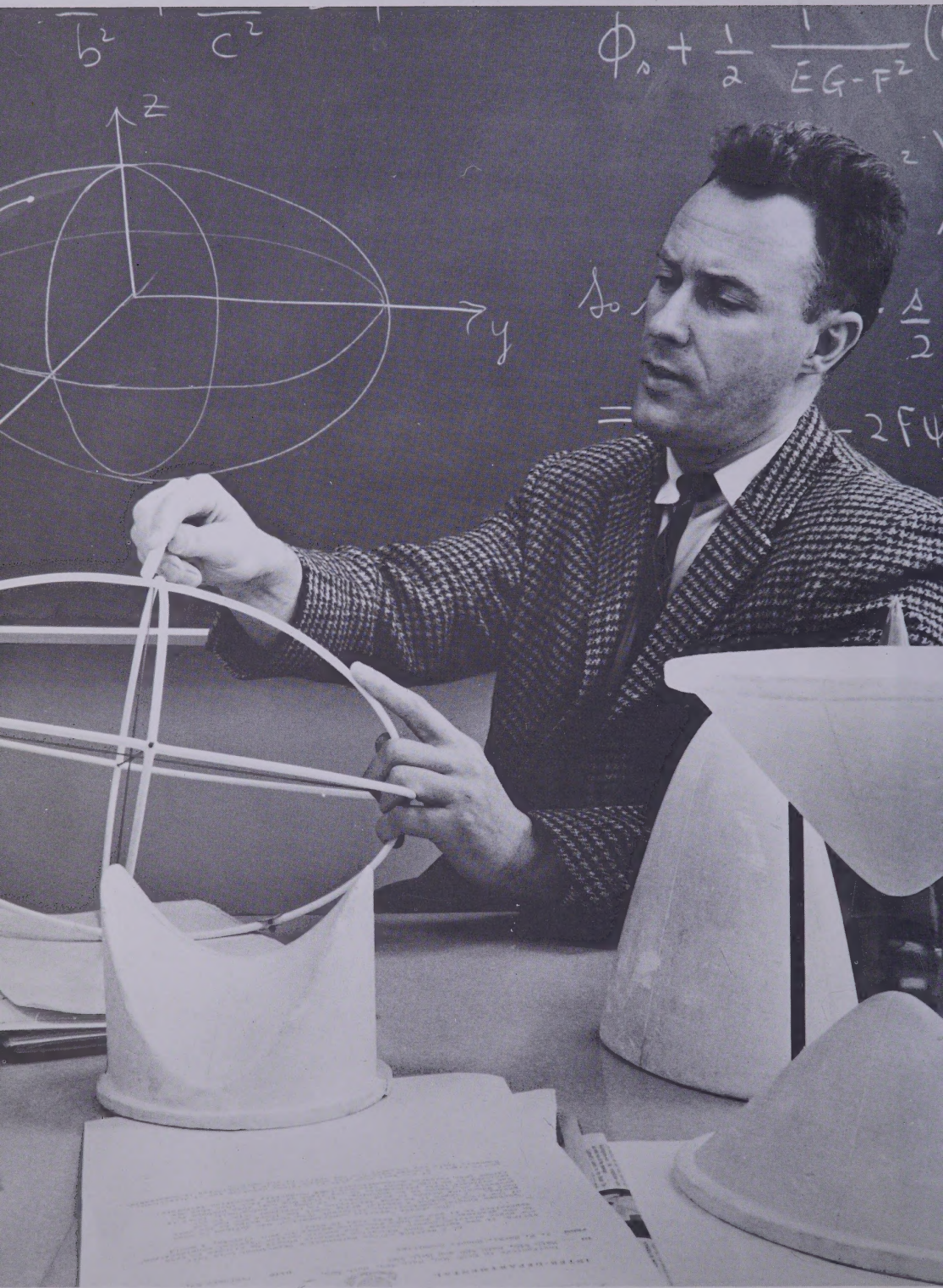
*On admissions, examinations, registration, records, transcripts, Convocation*—A. D. Cairns, Registrar.

*On change of faculty, interest and aptitude tests, personal problems, unsatisfactory standing, vocational planning, withdrawal from University*—A. J. B. Hough, Director, Student Counselling Services.

*On financial assistance*—R. B. Wishart, Administrator of Student Awards.

*On University residences and other housing*—D. A. P. Bone, Director, Food and Housing Services.

(3) The office hours of the University are from 8:30 a.m. to 12 noon and from 1:00 p.m. to 4:30 p.m. Monday to Friday (except holidays) throughout the year. Telephone number: 432-3111 (area code 403).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# *University Regulations and Information for Students*

## 11 / ACADEMIC SCHEDULE

### 11.1 / *July, 1968*

*Monday, 1*

Sixty-first academic year begins. (The University Act was passed by the Alberta Legislature in 1906; the first President of the University was appointed in 1908, and the first academic year in which classes were held was 1908-09.)

*Tuesday, 2*

Last day for receiving applications for admission to Law.

Last day for receiving applications for undergraduate admission from outside Canada to the 1968-69 Session.

8 a.m. Summer Session lectures begin in full and First Term courses.

9 to 11 a.m. and 12 noon to 2 p.m. Confirmation of registration of Summer Session students.

*Tuesday, 9*

Last day for payment of 1968 Summer Session fees.

*Monday, 15*

Last day for students with unsatisfactory university records to notify the Student Counselling Services that they are seeking re-admission.

Last day for receiving formal applications for admission to the 1968-69 Session from residents of Canada seeking admission to undergraduate programs except the M.D. (April 1), D.D.S. and B.L.S. (May 15), and LL.B. (July 2).

Applications for Graduate degrees, and degrees in Arts, Business Administration and Commerce, Education, Household Economics, Pharmacy and Science to be conferred at Fall Convocation should be filed by this date.

*Monday, 22*

Last day for receiving applications for regular supplementals in all faculties and schools.

*Tuesday, 23*

Summer Session final examinations in First-Term courses begin.

*Wednesday, 24*

8 a.m. Second Term Summer Session lectures begin.

### 11.2 / *August, 1968*

*Monday, 12*

Regular Winter Session supplemental examinations begin.

*Wednesday, 14*

Summer Session final examinations in full and Second-Term courses begin.

*Thursday, 15*

Last day for receiving formal applications for admission to the Faculty of Graduate Studies.

Last day for receiving registrations in the Evening Credit Program (including registrations by students in the Faculty of Graduate Studies). Applications for admission from new students must have been received by the deadlines referred to above.

*Monday, 19*

9 a.m. Registration of students in the School of Library Science.

1:30 p.m. Four-week period of orientation in Library Science begins.

### 11.3 / *September, 1968*

*Monday, 2*

Labor Day; University buildings closed.

*Tuesday, 3*

Outdoor School begins for third year students in B.P.E. and B.A. in Recreation Administration.

8:30 a.m. Registration of all students in the D.D.S. and Dental Hygiene programs.

10:30 a.m. Registration of all students in LL.B. program.

1:30 p.m. Registration of all students in the M.D. program.

*Tuesday, 3, and Wednesday, 4*

Orientation exercises for students in

Dental Hygiene.

*Tuesday, 3, to Friday, 6*

Last week for securing departmental approval of Graduate Program forms.

*Wednesday, 4*

8 a.m. Lectures begin in Faculties of Medicine and Law and in second, third, and fourth years in Faculty of Dentistry.

*Wednesday, 4, and Thursday, 5*

Orientation exercises for first year Dental students.

*Thursday, 5*

Lectures begin in the School of Dental Hygiene.

9 a.m. Registration of third year students in B.P.E. and B.A. in Recreation Administration programs.

*Friday, 6*

Lectures begin in first year in Faculty of Dentistry.

*Monday, 9, to Thursday, 12*

Registration of all students in Agriculture; Arts; Business Administration and Commerce; Divinity; Education; Engineering; Graduate Studies; Household Economics; Medical Laboratory Science; Nursing; Pharmacy; first, second, and fourth years of Physical Education and Recreation Administration; Rehabilitation Medicine; and Science, according to published schedule.

*Thursday, 12*

Outdoor School ends for third-year B.P.E. and B.A. in Recreation Administration students.

*Friday, 13*

Regular lectures begin for all students registering in previous four days.

*Saturday, 14*

Special supplemental examinations.

*Monday, 16*

Evening Credit Program classes begin.

*Wednesday, 25*

Last day for changes in registration in Agriculture, Arts, Business Administration and Commerce, Education, Engineering, Household Economics, Medical Laboratory Science, Nursing, Pharmacy, Physical Education, Rehabilitation Medicine, and Science.

## 11.4 / *October, 1968*

*Monday, 14*

Thanksgiving Day; University buildings closed.

*Tuesday, 15*

Last day for payment of undergraduate fees.

*Monday, 28*

Mid-term Test Week begins. Students will not be granted permission to leave the campus for extra-curricular activities during Test Week.

## 11.5 / *November, 1968*

*Monday, 4*

Notice of intention to be absent from Fall Convocation must be given by 4:30 p.m.

*Monday, 11*

Remembrance Day; lectures and laboratories withdrawn.

*Saturday, 16*

Fall Convocation.

## 11.6 / *December, 1968*

*Saturday, 14*

Last day of lectures in first term.

*Monday, 16, to Saturday, 21*

Mid-session Examination Week. Students will not be granted permission to leave the campus for extra-curricular activities during Examination Week.

*Sunday, 22*

Christmas Vacation begins.

*Tuesday, 31*

Last day for receipt of applications for Certificates of Post-Graduate Qualification in Medicine.

## 11.7 / *January, 1969*

*Monday, 6*

8 a.m. Second-Term lectures begin in Dentistry, Dental Hygiene, and Medicine.

*Wednesday, 8*

8 a.m. Second-Term lectures begin in all other faculties and schools.

Applications for admission to Dentistry and Medicine from pre-professional students attending here should be submitted by this date.

*Wednesday, 15*

Last day for payment of second instalment of fees.

## 11.8 / *February, 1969*

*Monday, 3*

Application for Graduate degrees, and degrees in Arts, Business Administration and Commerce, Education, Pharmacy, and Science to be conferred at Spring Convocation should be filed by this date.

*Saturday, 15*
Varsity Guest Weekend. Lectures and laboratories withdrawn.
*Friday, 21*
Winter meeting of the University Senate.

## 11.9 / *March, 1969*

*Friday, 7, to Sunday, 9* (inclusive)
Second Term recess.
*Wednesday, 26*
Last day for receiving applications for supplemental examinations to be written in April or May.

## 11.10 / *April, 1969*

*Tuesday, 1*
Last day for receipt of applications for admission from new students, undergraduate or graduate, who wish to enter the University in the 1969 Summer Session. (See Summer Session Calendar.)
Last day for receiving applications for admission to Medicine in the 1969-70 Session.
*Thursday, 3*
Last day of lectures for second-year Civil and Mining Engineering students.
*Friday, 4*
Good Friday; University buildings closed.
*Monday, 7, to Saturday, 12*
Final examinations for second-year Civil and Mining Engineering students.
*Friday, 11*
Last day of lectures for students in Agriculture, Arts, Business Administration and Commerce, Education, Engineering (except second-year Civil and Mining Engineering—see April 3), Graduate Studies, Household Economics, Library Science, Medical Laboratory Science, Nursing, Pharmacy, Physical Education, Rehabilitation Medicine and Science.
*Monday, 14*
Survey School begins for second-year Civil and Mining Engineering students.
*Thursday, 17*
Final examinations begin for students mentioned under April 11.
*Saturday, 19*
Last day of lectures for students in Law and Dental Hygiene.
*Monday, 21*
Final examinations begin in Law and Dental Hygiene.
*Saturday, 26*
Last day of lectures in fourth-year Medicine.
*Monday, 28*
Field experience begins for final-year degree and diploma students in School of Nursing.
Field Training Program begins for first-year Dental Auxiliary students.
*Wednesday, 30*
Last day for registration of students in the Summer Session.

## 11.11 / *May, 1969*

*Friday, 2*
Survey School ends.
*Saturday, 3*
Last day of lectures in Dentistry, and in first, second and third years of Medicine.
*Monday, 5*
Final examinations begin in Dentistry, and in first, second and third years of Medicine.
Twelve weeks period of Hospital Practice for students in School of Rehabilitation Medicine begins.
*Friday, 9*
Charter Day.
Notice of intention to be absent from Convocation must be given by 12 noon.
*Monday, 12*
Third-year B.Sc. (M.L.S.) students begin year of practical training.
*Thursday, 15*
Last day for receiving applications for admission to Dentistry and Library Science.
*Tuesday, 27*
Convocation (Part I)
*Wednesday, 28*
Convocation (Part II)
*Thursday, 29*
Convocation (Part III)
*Friday, 30*
Convocation (Part IV)

## 11.12 / *June, 1969*

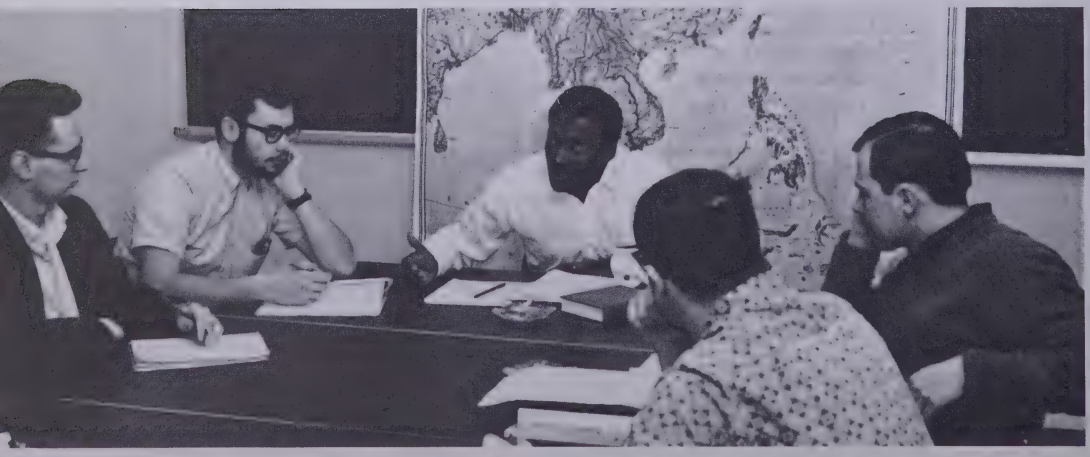
*Wednesday, 4*
Last day for payment of 1969 Summer Session fees without penalty.
*Monday, 30*
Sixty-first academic year ends.

# 12 / CLASSIFICATION OF PROGRAMS AND STUDENTS

## 12.1 / *Programs of Study*

The faculties and schools of the University offer programs leading to a degree, a diploma, or entrance to a further program, as shown below. Years of study are counted from Senior Matriculation unless otherwise noted.

| | *Years of Study* |
|---|---|
| *Faculty of Agriculture* | |
| B.Sc. (Agriculture) | 4 |
| B.Sc. (Food Science) (interdisciplinary program) | 4 |
| Pre-Veterinary Medicine program (leading to entrance to Veterinary Medicine program at the University of Saskatchewan) | 2 |
| *Faculty of Arts* | |
| B.A. (Honors) | 4 |
| B.A. (General program) | 3 |
| B.F.A. | 4 |
| B.Mus. | 4 |
| B.A., LL.B. (combined program) | 5 |
| *Faculty of Business Administration and Commerce* | |
| B.Com. | 4 |
| *School of Dental Hygiene* | |
| Dental Auxiliary Certificate | 2 |
| Dental Hygiene Diploma | 2 |
| *Faculty of Dentistry* | |
| D.D.S. (after two pre-professional years) | 4 |
| Postgraduate Diploma—see Faculty of Dentistry section of the Calendar | |
| *Faculty of Education* | |
| B.Ed. (Elementary or Secondary route) | 4 |
| B.Ed. (Industrial Arts) | 4 |
| B.Ed. (Vocational Education) | 4 |
| Post-graduate diploma in Education, or B.Ed. after previous degree—see Faculty of Education section of the Calendar | |
| *Faculty of Engineering* | |
| B.Sc. (Chemical, Civil, Electrical, Mechanical, Mining, or Metallurgical program) | 4 |
| *School of Household Economics* | |
| B.Sc. (Clothing and Textiles, Food and Nutrition, or General program) | 3 |
| *Faculty of Law* | |
| LL.B. (after B.A. or other acceptable degree) | 3 |
| B.A., LL.B. (combined program) | 5 |
| Postgraduate Diploma—see Faculty of Law section of the Calendar | |
| *School of Library Science* | |
| B.L.S. (after B.A. or other acceptable degree) | 1 |
| *Faculty of Medicine* | |
| M.D. (after two pre-professional years) | 4 |
| B.Sc. (after M.D., or following second year of M.D. program) | 1 |
| B.Sc. (Medical Laboratory Science) | 4 |



*School of Nursing*

| | |
|---|---|
| B.Sc. | 4 |
| B.Sc. (post-basic program, after hospital graduation) | 2 |
| Diploma in Public Health (after hospital graduation) | 1 |
| Diploma in Nursing Teaching and Supervision (after hospital graduation) | 1 |

*Faculty of Pharmacy*

| | |
|---|---|
| B.Sc. | 4 |

*Faculty of Physical Education*

| | |
|---|---|
| B.P.E. | 4 |
| B.A. (Recreation Administration) | 4 |

*School of Rehabilitation Medicine*

| | |
|---|---|
| Diploma in Physical Therapy | 3 |
| Diploma in Occupational Therapy | 3 |
| Diploma in Teaching Occupational Therapy (after graduation in Occupational Therapy and at least two years of clinical experience) | 2 |

*Faculty of Science*

| | |
|---|---|
| B.Sc. (Honors) | 4 |
| B.Sc. (Specialized program) | 4 |
| B.Sc. (General program) | 3 |

*St. Stephen's College*

| | |
|---|---|
| B.D. (after B.A. or other acceptable degree) | 3 |

*Faculty of Graduate Studies*

M.A., M.B.A., M.Ed., M.Eng., M.H.S.A., LL.M., M.Sc., Ph.D., Ed.D.—see Graduate Studies, § § 201 to 204 of the Calendar

## 12.2 / *Classification of Students*

Students are classified as undergraduates, graduates, extramural students, special students, and auditors.

(1) *Undergraduate students* are those who are taking one or more courses for credit towards any degree other than those awarded under the auspices of the Faculty of Graduate Studies. These students fall into two categories:

(i) Full-time students—those who are registered in three or more full courses or the equivalent.

(ii) Part-time students—those who are registered in less than three full courses or the equivalent.

(2) *Graduate students* are those who have been admitted to the Faculty of Graduate Studies. A further classification of graduate students will be found in § 202.1 of the Graduate Studies Section of the Calendar.

(3) *Extramural students* are those who are permitted to take a course without attending lectures. This privilege is sometimes granted to graduate students or to other students who have failed in one course in their graduating year and who have been permitted to repeat the course without attendance.

(4) *Special students* are those who, although registered in one or more courses, are neither seeking credit towards a degree or diploma, nor entrance into a graduate program.

(5) *Auditors* are students who have been granted official permission to attend lectures in a course on the understanding that they may not participate in class discussions (except at the invitation of the instructor), undertake assignments, or sit for examinations. The audit privilege is restricted to a student who is currently registered in a degree or diploma program, and who presents to the Registrar written permission from the instructor in the course, endorsed by the student's Dean or Director, to register in the course as an auditor.

## 12.3 / *Evening Credit Program and Summer Session*

For the benefit of those who wish to take courses for credit towards a degree or diploma but who are unable to attend daytime classes during the Winter Session, the University offers a limited selection of courses at other times in its Evening Credit Program and Summer Session.

Courses in the Evening Credit Program are offered in the evening and on Saturdays for the convenience of persons employed during the day. In 1967-68, courses were offered at Camrose, Evansburg, Grande Prairie, Ponoka, Red Deer, Smoky Lake, Vegreville, Viking, and Westlock, as well as at Edmonton. An Evening Credit Program calendar may be obtained from the Office of the Registrar.

In its Summer Session at Edmonton, The University of Alberta offers a considerable selection of courses for the convenience of students who are unable to attend the regular session. Special attention is given to meeting the needs of teachers desirous of improving their professional qualifications. A Summer Session calendar may also be obtained from the Office of the Registrar.

# 13 / ADMISSION

## 13.1 / *Matriculation from Alberta: University Requirements*

### 13.1.1 / MATRICULATION FROM ALBERTA HIGH SCHOOLS

Every applicant for admission from the high schools of Alberta must normally possess:

(1) an Alberta High School diploma, with "B" or higher standing in the subjects required by the faculty or school to which admission is sought, and

(2) an over-all average of at least 60.0 per cent, or more if required by the faculty or school to which admission is sought.

NOTE A: *Biology 32* will be accepted as a matriculation subject only if taken before September 1965, except in the Faculty of Education, which will accept it as the one allowable non-examination subject, providing Biology 30 is not presented in addition.

NOTE B: *Language Credits.* While applicants for admission usually present credit in one of the languages other than English in which there is an Alberta matriculation examination, other languages at an equivalent level may be considered. An applicant wishing to present such a language should submit evidence of his attainment to the Dean of the faculty to which he seeks admission.

NOTE C: *Mathematics 31* is acceptable only if credit was obtained by departmental examination in June 1962 or subsequently.

NOTE D: *Failure in Departmental Examinations.* An applicant who, after the Departmental Examinations in June, has deficiencies due to failure that would require him to write more than two supplemental Departmental Examinations in August to meet the admission requirements, will not be considered for admission in the same year. Moreover, any applicant who has to write what the University considers an inordinate number of examinations, because of failures and low marks, in order to attain the nominal entrance requirements of the University, may be refused admission on the grounds that his chances for success at the University are remote.

NOTE E: *Adult Applicants.* An applicant whose matriculation credits were secured in 1954 or earlier will be given full consideration by most faculties and schools. Such an applicant should forward to the Registrar complete transcripts of his high school record. A faculty or school may, at its discretion, waive the requirement of a high school diploma for an adult applicant.

However, an applicant seeking admission in these circumstances should understand that in many subject areas satisfactory standing in the proper Grade XII course is prerequisite to attempting university courses.

### 13.1.2 / ELIGIBILITY FOR ENROLMENT

The programs of study in the University are, unless otherwise specified, open to men and women on equal terms.

### 13.1.3 / LIMITATION ON ENROLMENT

Enrolment in any faculty or school must necessarily be limited to the number of students that can be accommodated. When the number of applicants exceeds the number of places available, students are normally accepted in the order of their academic standing from among the whole list of applicants.

Limited enrolment is now in force in the Dental Hygiene, Dentistry, Library Science, Medical Laboratory Science, Medicine, Nursing, Pharmacy, and Rehabilitation Medicine programs.

### 13.1.4 / REFUSAL OF ADMISSION

Notwithstanding anything in its regulations, The University of Alberta may at its discretion refuse admission to any applicant. Admission will normally be refused to an applicant who has had to write what the University considers an inordinate number of examinations in order to attain the nominal entrance requirements of the University.

## 13.2 / *Faculty of Agriculture*

### 13.2.1 / B.SC. PROGRAM IN AGRICULTURE

*Matriculation Subjects*

(1) English 30
(2) Mathematics 30
(3), (4), and (5) Three of:
- (i) Biology 30 (recommended)
- (ii) Chemistry 30 (recommended)
- (iii) Physics 30
- (iv) Mathematics 31
- (v) French 30 or German 30 or Latin 30 or Ukrainian 30 or another language other than English at an equivalent level
- (vi) Social Studies 30

*Matriculation Subjects from Alberta Agricultural and Vocational College*

Alberta Agricultural and Vocational College students applying for admission must present their College Diploma together with "B" or higher standing in Literature 20; Language 20; Social Studies 20; Mathematics 30; and two of Biology 30, Chemistry 30, Physics 30.

*Required Average*

At least 60.0 per cent (on Grade XII subjects presented).

### 13.2.2 / INTERDISCIPLINARY B.SC. PROGRAM IN FOOD SCIENCE

A four-year interdisciplinary program in Food Science is offered jointly by the Faculty of Agriculture, the School of Household Economics, and the Faculty of Science.

*Matriculation Subjects*

(1) English 30
(2) Chemistry 30
(3), (4), and (5) Three of:
  (i) Biology 30 (preferred)
  (ii) Mathematics 30 (preferred)
  (iii) Physics 30
  (iv) Social Studies 30
  (v) French 30, German 30, or Latin 30, or Ukrainian 30, or another approved language other than English at an equivalent level

*Required Average*

At least 60.0 per cent.

Inquiries should be directed to the Dean, Faculty of Agriculture.

### 13.2.3 / PRE-VETERINARY MEDICINE PROGRAM

A two-year pre-Veterinary Medicine program at The University of Alberta is designed to qualify students to enter the Veterinary Medicine program at the University of Saskatchewan.

*Matriculation Subjects*

(1) English 30
(2) Mathematics 30
(3) French 30, or German 30, or Latin 30, or Ukrainian 30, or another approved language other than English at an equivalent level
(4) and (5) Two of:
  (i) Biology 30
  (ii) Chemistry 30
  (iii) Physics 30

*Required Average*

At least 60.0 per cent.

NOTE: If a student lacks a language other than English, another examination subject may be accepted for entrance to the pre-Veterinary Medicine Program. However, credit for a language other than English to the senior matriculation level must be obtained before a student can proceed to the second year of the doctoral program.

## 13.3 / *Faculty of Arts*



### 13.3.1 / B.A. AND B.F.A. PROGRAMS

*Matriculation Subjects*

(1) English 30
(2) Social Studies 30
(3) French 30 or German 30 or Latin 30 or Ukrainian 30 or another approved language other than English at an equivalent level
(4) One of:
  (i) Biology 30
  (ii) Chemistry 30
  (iii) Mathematics 30 (see Note A)
  (iv) Physics 30
(5) One of:
  (i) a subject listed under (4) not already chosen
  (ii) a second language as listed under (3)
  (iii) Mathematics 31 (see Note B)
  (iv) a five-credit Grade XII subject from the Fine Arts group (from amongst Art 30, Drama 30, Music 30 or Music 31; see Note C)

*Required Average*

At least 60.0 per cent, computed on the four highest Grade XII examination subjects.

NOTE A: *Mathematics 30.* A student proposing to specialize in Economics, Political Science, or Psy-

*Dr. F. P. Galbraith, Chancellor of the University (at right), with the Right Honourable Roland Michener, Governor General of Canada, who received a B.A. from the University in 1920, and an honorary LL.D. in 1967.*

chology is advised to offer Mathematics 30 as one of his options. At considerably less convenience to himself, a student who lacks credit in Mathematics 30 may enrol for Mathematics 100 during his first year at the university, in order to prepare for such specialization.

NOTE B: *Mathematics 31* is required for the B.A. with Honors in Mathematics.

NOTE C: *Equivalents of Music 30 or 31.* In terms of the Western Board of Music, the qualifications equivalent to Music 30 or 31 would be Grade VIII Practical and Grade V Theory. In terms of the Royal Conservatory of Music of Toronto, the equivalent would be Grade VIII Practical and Grade III Harmony. Documents from the Western Board of Music or the Royal Conservatory must be presented to the Alberta Department of Education for evaluation.

NOTE D: *Matriculation Deficiencies.* Courses (usually numbered 100) at the Grade XII level are offered at the University for students who are beginning their study of a particular subject. In certain circumstances, and only with the permission of the Dean, a student may take one such course to remove a matriculation deficiency, in which case it will not count towards a degree.

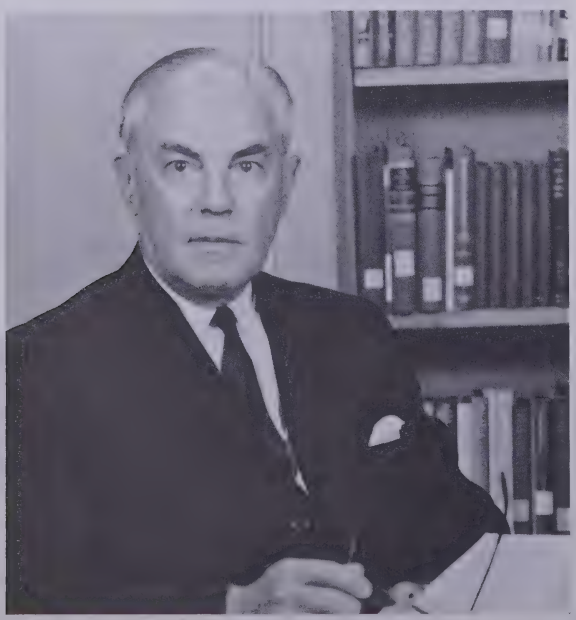
### 13.3.2 / B.MUS. PROGRAM

Matriculation requirements for the B.Mus. program are the same as those for the B.A. and B.F.A. programs, except that the applicant must present credit in the Grade VIII practical and Grade IV and V Theoretical examinations of the Western Board of Music, or the equivalent (see Note C to § 13.3.1, above).

### 13.3.3 / COMBINED PROGRAM FOR THE DEGREES OF B.A., LL.B.

Matriculation requirements for the five-year combined program leading to the degrees of B.A., LL.B. are the same as those for the B.A. and B.F.A. programs, except that the required average, computed on the four highest Grade XII examination subjects, is at least 65.0 per cent.

*Dr. Walter H. Johns, President of the University*



## 13.4 / *Faculty of Business Administration and Commerce*

### 13.4.1 / B.COM. PROGRAM

*Matriculation Subjects*

(1) English 30
(2) Social Studies 30
(3) Mathematics 30
(4) and (5) Two of:
- (i) Chemistry 30
- (ii) Physics 30
- (iii) Biology 30
- (iv) Mathematics 31
- (v) French 30 or German 30 or Latin 30 or Ukrainian 30 or another approved language other than English at an equivalent level

*Required Average*

At least 60.0 per cent.

## 13.5 / *School of Dental Hygiene*

### 13.5.1 / DENTAL HYGIENE DIPLOMA AND DENTAL AUXILIARY CERTIFICATE PROGRAMS

*Matriculation Subjects*

(1) English 30
(2) Chemistry 30
(3), (4), and (5) Three of:
- (i) Biology 30 (strongly recommended)
- (ii) Physics 30
- (iii) Mathematics 30
- (iv) Social Studies 30
- (v) French 30 or German 30 or Latin 30 or Ukrainian 30 or another approved language other than English at an equivalent level

*Required Average*

At least 60.0 per cent.

NOTE A: *Eligibility for Enrolment.* The programs of study in the School of Dental Hygiene are open to men and women but are particularly suited to young women. There is no minimum age requirement.

NOTE B: *Academic standing.* Enrolment in the School of Dental Hygiene is limited. Candidates will be selected according to academic standing. No student will be accepted on a conditional standing.

NOTE C: *Interview.* In selecting applicants consideration will be given to satisfactory personality and physique. Applicants should arrange a personal interview with the Director of the School prior

to the meeting of the Admissions Committee of the School in August.

NOTE D: *Dental Examination.* Applicants are requested to have the Dental Examination Form (available from the Registrar's Office or the School of Dental Hygiene) completed by a dentist and returned to the Director of the School.

## 13.6 / *Faculty of Dentistry*

### 13.6.1 / D.D.S. PROGRAM

Satisfactory completion of at least two years of university work after senior matriculation, including full courses in inorganic chemistry, organic chemistry, physics, and biology, is required. In general, consideration for admission to the limit of available accommodation will be given to those students with a grade-point average of at least 5.5 (or equivalent) in all courses taken after senior matriculation. Matriculants are advised to enter either the Faculty of Science or the Faculty of Arts to fulfil this requirement. For further details see § 67.1 of the Faculty of Dentistry section of the Calendar.

## 13.7 / *Faculty of Education*

### 13.7.1 / B.ED. PROGRAM

*Matriculation Subjects*

(1) English 30
(2), (3), and (4) Three five-credit subjects in which departmental examinations have been written (see Note A).
(5) Another five-credit Grade XII subject, which may or may not be one in which a departmental examination has been written (see Note B).

*Required Average*

At least 60.0 per cent on the four highest examination subjects.

NOTE A: *Choice of Matriculation Subjects.* Matriculants are advised to present those Grade XII subjects basic to the subject area in which they plan to specialize.

NOTE B: *Choice of Non-Examination Subject.* A student may not present for admission an examination and a non-examination subject in the same field except where the examination subject is a prerequisite or a corequisite for the non-examination subject.

NOTE C: *Equivalents of Music 30 and 31.* In terms of the Western Board of Music, the qualifications equivalent to Music 30 or 31 would be Grade VIII Practical and Grade V Theory. In terms of the Royal Conservatory of Music of Toronto, the equivalent would be Grade VIII Practical and Grade III Harmony. Documents from the Western Board of Music or the Royal Conservatory must be presented to the Alberta Department of Education for evaluation.

NOTE D: *Competence in Spoken English.* Students planning to enter a teacher education program in the Faculty of Education may be required to present proof of their competence in spoken English.

NOTE E: *Adult Applicants.* Adult applicants (age 20 or over) will not be required to present a high school diploma, but the regular subject requirements still apply.

NOTE F: *Further Information.* Information about admission with advanced standing, etc., is given in § 72.1 of the Faculty of Education section of the calendar.

### 13.7.2 / B.ED. PROGRAMS IN VOCATIONAL EDUCATION

(1) The program for vocational teachers, Route I, is designed for students holding trade training as verified by a recognized Certificate of Qualification as a Journeyman for a designated trade or equivalent for a non-designated trade. In addition the candidate must have experience in a trade or industry.

Admission to the Vocational Teacher program is based on the matriculation requirements of the Faculty of Education, usually on this program *five* Grade XII departmental examination subjects, one of which must be English 30. Completion of an intramural year of this program qualifies successful candidates for certification. Students interested in this program should consult the Associate Dean (Student Programs & Records), Faculty of Education.

(2) The program for the degree of B.Ed. in Vocational Education, Route II, is designed for students coming from vocational high schools or institutes of technology, who will not have had sufficient work experience to qualify them for a journeyman's certificate. Together with the matriculation requirements as defined for the general B.Ed. program, they must present a minimum of thirty-five credits in Vocational Education with at least a 60 per cent average on these credits.

A program of ten weeks' field experience is also required before regular classes begin in September of the first year.

Applicants planning to register in this program should consult the head of the Department of Industrial and Vocational Education well in advance of the date of their initial registration in order to arrange for their supervised field experience.

## 13.8 / *Faculty of Engineering*

### 13.8.1 / B.SC. PROGRAM IN ENGINEERING

*Matriculation Subjects (preferred)*

(1) English 30
(2) Mathematics 30
(3) Mathematics 31
(4) Chemistry 30
(5) Physics 30

*Required Average*

At least 60.0 per cent.

NOTE A: *Deficiency in Mathematics 31.* Students who are deficient in Mathematics 31 will be considered for admission if they present the following course pattern: English 30; Mathematics 30; Physics 30; Chemistry 30; one of Social Studies 30, or Biology 30, or an approved Grade XII language other than English. The Mathematics 31 deficiency will be made up by adjustment of the first year mathematics course.

NOTE B: *Deficiency in Other Subjects.* Students who are deficient in any other subjects are encouraged to seek admission. Program adjustments will be necessary to clear the deficiencies.

NOTE C: Students who completed the bulk of their high school work two or more years prior to making application for admission are required to consult the Dean and the Student Counselling Services by July 15.

## 13.9 / *School of Household Economics*

### 13.9.1 / B.SC. PROGRAM IN HOUSEHOLD ECONOMICS

*Matriculation Subjects*

(1) English 30
(2) Chemistry 30
(3), (4), and (5) Three of:
- (i) Mathematics 30
- (ii) Social Studies 30
- (iii) Physics 30
- (iv) Biology 30
- (v) French 30, or German 30, or Latin 30, or Ukrainian 30, or another approved language other than English at an equivalent level

*Required Average*

At least 60.0 per cent.

NOTE: Although home economics courses are not required for admission, students will probably gain additional benefits from the university program if they have studied home economics in high school.

### 13.9.2 / INTERDISCIPLINARY B.SC. PROGRAM IN FOOD SCIENCE

See under Faculty of Agriculture, § 13.2.2, above.

## 13.10 / *Faculty of Law*

### 13.10.1 / LL.B. PROGRAM

Either a B.A. (or equivalent degree) or completion of the first two years of the B.A., LL.B. program is required for admission to Law. Matriculation requirements for the B.A. program and for the combined B.A., LL.B. program are given above, in §§ 13.3.1 and 13.3.3 respectively.

## 13.11 / *School of Library Science*

### 13.11.1 / B.L.S. PROGRAM

A bachelor's degree and reading knowledge of a language other than English are required for admission. Some experience of library work is strongly recommended. For details, see § 112.1 of the School of Library Science section of the Calendar.

## 13.12 / *Faculty of Medicine*

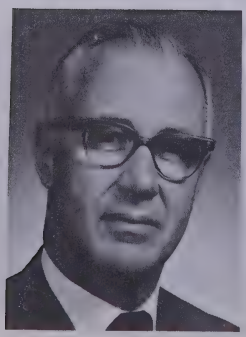
### 13.12.1 / M.D. PROGRAM

Satisfactory completion of at least two years of university work after senior matriculation, including full courses in organic chemistry, inorganic chemistry, physics, and biology, and with an over-all grade-point average of at least 5.5, is required for admission. Matriculants are advised to enter the Faculty of Science or the Faculty of Arts to fulfil this requirement. For further details, see § 122.1 of the Faculty of Medicine section of the Calendar.

### 13.12.2 / B.SC. PROGRAM IN MEDICAL LABORATORY SCIENCE

*Matriculation Subjects*

(1) English 30
(2) Chemistry 30
(3), (4), and (5) Three of:



*Dr. John E. Bradley, Chairman of the Board of Governors*

(i) Biology 30 (recommended)
(ii) Mathematics 30 (recommended)
(iii) Physics 30
(iv) Social Studies 30
(v) French 30, or German 30, or Latin 30, or Ukrainian 30, or another approved language other than English at an equivalent level

*Required Average*
At least 65.0 per cent.

## 13.13 / *School of Nursing*

### 13.13.1 / B.SC. PROGRAM IN NURSING

*Matriculation Subjects*
(1) English 30
(2) Chemistry 30
(3) Biology 30
(4) and (5) Two additional Grade XII subjects in which departmental examinations are written

*Required Average*
At least 60.0 per cent.

### 13.13.2 / DIPLOMA PROGRAMS IN PUBLIC HEALTH AND IN NURSING TEACHING AND SUPERVISION

These programs are designed for registered nurses who can present matriculation as defined in § 13.13.1 above in addition to registration with the Alberta Association of Registered Nurses.

## 13.14 / *Faculty of Pharmacy*

### 13.14.1 / B.SC. PROGRAM IN PHARMACY

*Matriculation Subjects*
(1) English 30
(2) Chemistry 30
(3) and (4) Two of:
(i) Mathematics 30
(ii) Physics 30
(iii) Biology 30
(5) One of:
(i) the remaining subject of those listed under (3) and (4) (recommended)
(ii) French 30, or German 30, or Latin 30, or another approved language other than English at an equivalent level
(iii) another course in which a departmental examination has been written

*Required Average*
At least 60.0 per cent.

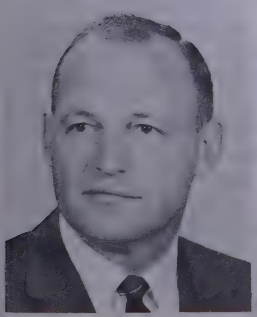
## 13.15 / *Faculty of Physical Education*

### 13.15.1 / B.A. PROGRAM IN RECREATION ADMINISTRATION

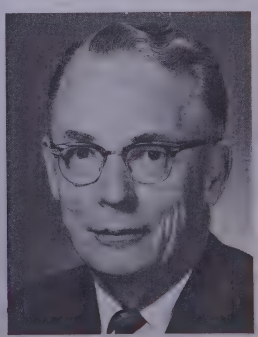
*Matriculation Subjects*
(1) English 30
(2) Social Studies 30
(3), (4), and (5) Three of:
(i) Biology 30
(ii) Chemistry 30
(iii) Mathematics 30
(iv) Physics 30
(v) Mathematics 31
(vi) French 30, or German 30, or Latin 30, or Ukrainian 30, or another approved language other than English at an equivalent level (see note A)
(vii) A five-credit Grade XII subject from the Fine Arts group (Art 30, Drama 30, or Music 30, or Music 31; see notes A and B)

*Required Average*
At least 60.0 in the four highest examination subjects.

NOTE A: Not more than one subject from the language group and one subject from the Fine Arts group will be accepted.



*University Vice-Presidents, Dr. Max Wyman (Academic), Dr. D. G. Tyndall (Finance and Administration), Dr. Walter H. Worth (Campus Planning and Development)*



*Prof. A. A. Ryan, Provost and Executive Assistant to the President*

NOTE B: *Equivalents of Music 30 and 31.* In terms of the Western Board of Music, the qualifications equivalent to Music 30 or 31 would be Grade VIII Practical and Grade V Theory. In terms of the Royal Conservatory of Music of Toronto, the equivalent would be Grade VIII Practical and Grade III Harmony. Documents from the Western Board of Music or the Royal Conservatory must be presented to the Alberta Department of Education for evaluation.

### 13.15.2 / B.P.E. PROGRAM

*Matriculation Subjects*

(1) English 30
(2) Chemistry 30
(3) Biology 30
(4) and (5) Two of:
  (i) Social Studies 30
  (ii) Physics 30
  (iii) Mathematics 30
  (iv) Mathematics 31
  (v) French 30, or German 30, or Latin 30, or Ukrainian 30, or another approved language other than English at an equivalent level (see note)

*Required Average*

At least 60.0 per cent.

NOTE: Not more than one subject from the language group will be accepted.

## 13.16 / *School of Rehabilitation Medicine*

*W. A. D. Burns, Assistant Registrar and Admissions Officer; L. P. Morgan, Associate Registrar; and A. D. Cairns, Registrar*

### 13.16.1 / DIPLOMA PROGRAM IN PHYSICAL OR OCCUPATIONAL THERAPY

*Matriculation Subjects*

(1) English 30
(2) Mathematics 30
(3) Biology 30
(4) and (5) Two of:
  (i) Chemistry 30
  (ii) Physics 30
  (iii) Mathematics 31
  (iv) Social Studies 30
  (v) French 30, or German 30, or Latin 30, or Ukrainian 30, or another approved language other than English at an equivalent level

*Required Average*

At least 60.0 per cent.

NOTE A: *Eligibility for Admission.* Men as well as women are accepted in the School of Rehabilitation Medicine.

NOTE B: *Age Limits.* Only in exceptional circumstances will an applicant under the age of seventeen or over the age of thirty-five years on October 1 of the year of application be admitted to the diploma programs.

NOTE C: *Physical and Personal Requirements.* Applicants must have satisfactory personality and physique and must meet the health and physical requirements of the University Health Services.

NOTE D: *Photograph and Interview.* A passport size photograph must accompany each application. All applicants will be required to arrange for an interview at the School prior to registration.

### 13.16.2 / TEACHER TRAINING DIPLOMA PROGRAM IN OCCUPATIONAL THERAPY

Graduation from a recognized school of Occupational Therapy, followed by a minimum of two years' clinical practice, is required for admission.

## 13.17 / *Faculty of Science*

### 13.17.1 / B.SC. PROGRAMS

*Matriculation Subjects*

(1) English 30
(2) Mathematics 30
(3) and (4) Two of:
  (i) Chemistry 30
  (ii) Physics 30
  (iii) Biology 30
(5) One of:
  (i) The remaining sciences listed under (3) and (4) above
  (ii) Mathematics 31 (see Note A)
  (iii) French 30, or German 30, or Latin 30, or Ukrainian 30, or another approved language other than English at an equivalent level
  (iv) Social Studies 30.

*Required Average*

At least 60.0 per cent.

NOTE A: *Mathematics 31* is required for entrance to the Honors Mathematics, Honors Physics, and Honors Physics and Geology programs, and is strongly recommended for those intending to study Biochemistry, Chemistry, Geology, Mathematics, Microbiology, and Physics.

NOTE B: *Matriculation Deficiencies.* Courses (usually numbered 100) at the Grade XII level are offered at the University for students who are beginning their study of a particular subject. In certain circumstances, and only with the permission of the Dean, a student may take one such course to remove a matriculation deficiency, in which case it will not count towards a degree.

### 13.17.2 / INTERDISCIPLINARY B.SC. PROGRAM IN FOOD SCIENCE

See under Faculty of Agriculture, § 13.2.2, above.

## 13.18 / *St. Stephen's College*

### 13.18.1 / B.D. PROGRAM

An acceptable bachelor's degree in Arts, Science, or Education is required for entrance into the B.D. program offered by St. Stephen's College. Students proposing to enter this program are advised to consult with the Dean of the College to determine the best prerequisite courses for their theological studies.

## 13.19 / *Faculty of Graduate Studies*

General admission requirements for the Faculty of Graduate Studies will be found in § 202.2 of the Graduate Studies section of the Calendar. Additional requirements, if any, for a particular graduate program will be found in the description of the program in § 204.

## 13.20 / *Matriculation from Outside Alberta*

### 13.20.1 / OTHER PROVINCES OF CANADA

A student from another province in Canada who has obtained clear senior matriculation for the university or universities of that province will be considered for admission to The University of Alberta subject to the requirements for the first year courses in each program. Students who do not have clear matriculation on this basis will be required to complete full Alberta matriculation for the faculty to which admission is sought. Senior matriculation standing in the Canadian provinces is as follows:

*Manitoba, Nova Scotia, Saskatchewan*—Grade XII.

*British Columbia, New Brunswick, Ontario*—Grade XIII.

*Prince Edward Island*—successful completion of one year at Prince of Wales College or St. Dunstan's University.

*Quebec*—Senior High School Leaving Certificate or Senior Catholic High School Leaving Certificate (Grade XII).

### 13.20.2/ THE UNITED STATES

An applicant from the United States may be considered for admission on the basis of one of the following:

(1) Successful completion, at an accredited university or college, of courses deemed by the Dean of the faculty concerned to be the equivalent of the subjects prescribed for admission to that Faculty.

(2) A full academic high school program plus scores in College Entrance Board Scholastic Aptitude tests and in specified Achievement tests that compare favorably with the mean scores achieved by Alberta matriculants. The C.E.E.B. achievement tests to be taken will be determined by the Dean of the faculty which the applicant wishes to enter.

### 13.20.3 / GREAT BRITAIN, WEST INDIES, EAST AND WEST AFRICA

*General Certificate of Education*—Either (i) five passes, of which two should be at the Advanced Level, or (ii) four passes with three at the Advanced Level, are required.

The passes at the Advanced Level should include the compulsory subjects, and those at the Ordinary Level should be applicable to the program that the applicant wishes to enter (see above).

*Higher School Certificate*—Two or three passes at the Principal Standard in the compulsory subjects and the remainder of passes at Subsidiary Level are required. The passes at the Principal Standard must include the compulsory subjects, and at the Subsidiary Level optional subjects prescribed for the program the applicant wishes to enter (see above). (Credit Level passes, or higher, in the examination for the School Certificate will be accepted in lieu of Subsidiary Standard passes.)

*West African School Certificate*—Credit Level passes, or higher in the examinations for the West African School Certificate will be accepted in lieu of Ordinary Level passes.

A student must meet the remaining admission requirements as for the General Certificate of Education.

### 13.20.4 / HONG KONG

*University of Hong Kong Matriculation Examination*—Two or three Advanced Level passes in the compulsory subjects (see above) and the remainder of passes at the Ordinary Level in other acceptable subjects are required. (Credit Level passes in the Hong Kong English School Certificate examination will be accepted in lieu of Ordinary Level passes, provided that the examination was taken in May 1965 or later.)

Admission requirements may also be met through the General Certificate of Education.

### 13.20.5 / AUSTRALIA AND NEW ZEALAND

*Australian and New Zealand Leaving or Matriculation Certificates*—In general a student who has matriculated or qualified to matriculate at a university of recognized standing in Australia or New Zealand will be considered for admission to this University on a reciprocal basis, subject to the requirements for the first-year courses in each program.

### 13.20.6 / INDIA AND PAKISTAN

An applicant educated in India or Pakistan is required to present a B.A. or B.Sc. degree, Division I, for admission to an undergraduate program.

*Athabasca Hall*

# 14 / APPLICATION PROCEDURE

## 14.1 / *Application Deadlines*

The following deadlines are effective for submitting applications, complete with all supporting documents required.

Applications for admission to the M.D. program—April 1.

Applications for admission to the D.D.S. and B.L.S. programs—May 15.

Applications for admission to the L.L.B. program—July 2.

Applications for admission to all other programs except Graduate Studies—July 15.

Applications for admission to Graduate Studies—August 15.

Applications received after these deadlines will be subject to a penalty fee of $10.00 for the first day, plus $1.00 for each subsequent day, up to a maximum of $25.00.

## 14.2 / *Applications and Transcripts*

Prospective undergraduate students who have not previously attended The University of Alberta at Edmonton must secure and complete "Application for Admission" forms. These forms may be obtained from the Registrar, The University of Alberta, Edmonton. The completed forms must be submitted to the Registrar by the prescribed deadline (see § 14.1 above). This requirement also applies to students from the Universities of Calgary and Lethbridge who wish to transfer to The University of Alberta. Since, in the case of all students entering from high school, the deadline is July 15, applicants should not wait to receive the results of their supplemental examinations before submitting applications.

Prospective graduate students should obtain "Application for Admission" forms from the Dean of Graduate Studies, The University of Alberta, Edmonton, and should submit the completed forms to him before the prescribed deadline (see § 14.1 above).

In addition, all prospective undergraduate students must arrange, prior to the application deadline, for an official transcript of their high school record and of their record at any other university or college they have attended (including the Universities of Calgary and Lethbridge) to be sent directly to the Registrar from the Alberta Department of Education or other institution maintaining the records. Applicants currently attending Alberta high schools may obtain Transcript Order Cards from their schools; other prospective undergraduate students may obtain these cards along with their "Application for Admission" forms from the Registrar. Transcripts for prospective graduate students should be sent to the Dean of Graduate Studies, The University of Alberta.

## 14.3 / *Visé Fees*

A fee of $5.00 is charged for evaluating educational documents issued in Canada but outside Alberta. The fee is $10.00 for documents issued outside Canada. Applicants for graduate study, however, are exempt from visé fees.

## 14.4 / *Medical Examination*

Every applicant for admission as a full-time student must have a medical examination and arrange for the results of the examination to be reported to the University before his application will be regarded as complete. A medical examination report form will be supplied to each prospective applicant with his application form. The applicant should present the medical report form to his own physician when he appears for his examination. This should be done by mid-July since all medical reports should be in the hands of the Director, Student Health Services, before August 1 to ensure adequate time for review.

Special arrangements exist in the School of Nursing.

## 14.5 / *Advanced Standing and Advanced Placement*

Applicants for admission who have previously completed some university work elsewhere may be admitted with advanced standing, which relieves them of the necessity of repeating this work at The University of Alberta. Applicants whose previous university work was extramural may be granted advanced standing under certain conditions but only with respect to the first year of their program. Applicants who have taken the equivalent of university courses in some other manner may be given advanced placement, rather than advanced standing, which

excuses them from taking the corresponding university courses, but requires them to substitute other courses in order to complete a program of normal weight at the University.

All applications for admission with advanced placement or advanced standing should be addressed to the Registrar well in advance of the beginning of the session. Each application will be dealt with on its own merits. The University reserves the right to require applicants for advanced standing or advanced placement to write examinations at any level including that of matriculation.

The amount of advanced standing that may be granted is limited by the residence requirement of the University, which provides that a student proceeding towards a first degree will normally be required to attend at least one academic year and complete a full year's program.

## 14.6 / *Re-Enrolment*

Students who have previously registered in a faculty or school and who are continuing their program without interruption are not required to re-apply for admission to subsequent years and may assume that they are re-admissible unless they have been otherwise informed by the Registrar or by their Dean or Director.

Students who have interrupted their program for one or more Winter Sessions are normally re-admissible, but must complete and submit Re-enrolment forms, obtainable from the Registrar's office.

# 15 / REGISTRATION AND FEES

## 15.1 / *Registration*

### 15.1.1 / REGISTRATION PROCEDURE

Students should consult the Academic Schedule, § 11 of this Calendar, to determine the date on which they should register. Other necessary details will be supplied prior to registration.

The program in which a student seeks to register is in every case subject to the approval of the faculty or school concerned. Students should note that they are required to register in courses in which they are deficient before registering in any other courses. The faculty and school councils reserve the right to adjust courses to meet the needs of time-tables of lectures and examinations. Registration in courses which directly conflict on the time-table will only be allowed when express permission of the faculty or school council concerned has been secured.

### 15.1.2 / RESPONSIBILITY FOR REGISTRATION

Each student is responsible for the completeness and accuracy of his registration. He is also responsible for adjustments in registration made necessary by supplemental examination results. Particular care should be exercised with regard to prerequisite courses.

### 15.1.3 / LATE REGISTRATION

Students are normally required to complete their registration, in person, by the date specified in the academic schedule. After the end of the registration period, registration will be permitted only in exceptional circumstances and with the payment of a penalty fee of $3.00 plus $1.00 per day. Where possible, application for late registration should be made to the Registrar in advance of the normal registration period.

### 15.1.4 / CHANGES IN REGISTRATION

A student may not abandon a course or change from one course to another without first obtaining permission from his Dean or Director. This permission, in the form of a "Change of Registration" form signed by the Dean or Director, must be presented to the Registrar before the change becomes official. Changes in registration will not normally be approved after the deadline appearing in the Academic Schedule.

### 15.1.5 / CANCELLATION OF REGISTRATION

A student who wishes to withdraw from the University should report at once to the Student Counselling Services in order to complete "Notice of Withdrawal" forms which must then be submitted to his Dean or Director for approval. A student who withdraws without completing such forms will not be eligible for any refund of fees, nor for exemption from fees in the event that he has not paid them.

A fee adjustment will be made on a pro rata basis and refunds will be authorized if cancellation of a student's registration is approved no later than March 15, and

if the completed withdrawal forms are received by the Fee Division of the Bursar's Office no later than March 31.

### 15.1.6 / INTERSESSION REGISTRATION

Graduate students carrying on full-time research or other academic work during the summer months may receive residence credit by registering with the Faculty of Graduate Studies for the whole, or a portion, of the period extending from the end of one regular Winter Session to the beginning of the next; this period is known as the Intersession. Application for such registration should be made as soon as the applicant's plans for this period are final.

## 15.2 / *Fees*

### 15.2.1 / PAYMENT OF FEES

Fees are due and payable at the time of registration; registration is regarded as incomplete until they have been paid, and is subject to cancellation unless payment has been made by the final date according to the regulations stated below.

Students are requested to report to the Fees Wicket, on the third floor of the Administration Building, before making payment. Payment by cash or cheque may be made to the Cashier at the adjoining wicket. Cheques may also be placed in a special deposit box provided in the entrance hall of the Administration Building during the registration period and up to September 30; or they may be mailed to the Bursar.

All cheques should be made payable at par to The University of Alberta.

Receipts for payments of fees received by mail will not be issued at the time of payment unless requested. All students will receive official receipts for income tax purposes before the following February 28.

If fees are to be paid from grants or loans arranged with the Alberta or Federal Governments, the student must provide this information on the reverse side of the fee card issued during registration. Students expecting assistance from another recognized source must produce a letter of confirmation on or before October 15 to avoid a late payment penalty. If the funds are not forthcoming a late payment penalty will be assessed. If funds are expected from a private source, arrangements must be made for payment of fees by the deadline. Also by the deadline, late registrants must inform the Fee Clerk in the Bursar's Office of assistance expected.

### 15.2.2 / REGULATIONS REGARDING PAYMENT

(1) The following regulations regarding payment of fees apply to *undergraduate students*:

(i) If desired, payment may be made in two instalments, in which case an additional charge of $5.00 will be added to the second instalment. A student receiving assistance which does not cover the first instalment of fees must pay the difference before the October deadline to avoid a $5.00 late payment penalty. The first instalment consists of full General fees and approximately 60 per cent of the Instruction fee. (Instalment privileges are not available to students taking less than two full daytime courses.)

(ii) The last day for payment of fees is October 15. If the student is paying in two instalments the last day for payment of the first instalment is October 15; of the second instalment, January 15. A penalty of $5.00 will be charged on any payment made or postmarked after these dates. In addition, if payment has not been made by October 31 for First-Term fees and January 31 for Second-Term fees, registration will be subject to cancellation and the student to exclusion from classes. A reassessment of fees will be made to the date of cancellation and the amount unpaid entered on the student's record. Future registrations will not be accepted until the account has been settled.

(iii) When a student has been permitted to register late, the last date for payment of fees will be fifteen days after the date of assessment. A penalty of $5.00 will be charged on any payment after this date. If payment is in instalments, the last date for payment of the second instalment is January 15 and the instalment charge detailed in (i) above will apply. A penalty of $5.00 will be charged on any payment made or postmarked after this date.

(2) Similar regulations apply to *graduate students,* with the following changes:

(i) A fee assessment sheet will be mailed to each student. The last date for payment of graduate fees is fifteen days after the date of assessment, as indicated on the fee assessment sheet. A penalty of $5.00 will be charged on any payments made or postmarked after this date. In addition, if fees are not paid within thirty days of the date of assessment, registration will be subject to cancellation and the student to exclusion from classes. A reassessment of fees will be made to the date of cancellation and the amount unpaid entered on the student's record. Future registrations will not be accepted until the account has been settled.

(ii) Instalment payment privileges are not normally available to graduate students. However, arrangements can be made with the Fee Clerk in the Bursar's Office to pay in two instalments if the fees exceed $340.00, in which case an additional charge of $5.00 will be added to the second instalment. The last date for payment of the second instalment is January 15. A penalty of $5.00 will be charged on any payment made or postmarked after this date.

(3) The following regulations apply to *extramural students*:

(i) Registration will not be accepted unless accompanied by the registration fee of $2.00 ($10.00 for graduate students) which is not refundable. Full fees are payable on assessment and if not paid as at November 30, registration will be cancelled.

(ii) A registration may not be carried over from one session to another session. If a student, for any reason not approved by his Dean or Director, fails to write his examination at the regular time, all fees are forfeited, and in order to be admitted to another examination in that course he must register in another session and pay the full fees. When deferred final examinations are granted they must be written at the time of the next regular University examination period.

## 15.2.3 / CHANGES IN FEES

The University reserves the right to change its fees from year to year without notice. Students who have not completed their program when a change is made will pay at the new rate for the balance of their program.

## 15.2.4 / FULL-TIME UNDERGRADUATE PROGRAM FEES

(1) *General fees* are charged per session as follows:

| | |
|---|---|
| Registration (School of Nursing, five-year degree program, fourth year only) | $10.00 |
| Students' Union (except as noted below) | 27.50 |
| Students' Union (full-time students in Dentistry, Education (B.Ed./AD and Diploma programs), Law, and Medicine (M.D. and B.Sc. in Medicine programs) ) | 20.00 |
| Students' Union (student nurses in the School of Nursing registered at The University of Alberta Hospital) | 15.00 |
| University Athletic Board | 8.00 |

(2) *Instruction fees* are charged per session as follows:

| | |
|---|---|
| All faculties and schools (except as noted below) | $400.00 |
| Engineering | 500.00 |
| Dentistry and Medicine (M.D. program only) | 600.00 |
| Nursing (Certificate course in Advanced Practical Obstetrics) | 150.00 |
| Nursing (five-year degree program, fourth year only) | gratis |

## 15.2.5 / PART-TIME UNDERGRADUATE PROGRAM FEES

(1) *General fees* are charged per session as follows to part-time undergraduates:

| | |
|---|---|
| Registration | $2.00 |
| Students' Union (Associate membership) | 5.00 |
| University Athletic Board (optional at registration) | 8.00 |

(2) *Instruction fees* are charged as follows for each *full course*:

| | |
|---|---|
| All faculties and schools (except as noted below) | $135.00 |
| Faculty of Engineering | 170.00 |
| Faculties of Medicine (M.D. program) and Dentistry | 200.00 |

The fee for a half-course is one-half that for a full course.

In no case will the total fees assessed any partial student exceed the total fee for a normal year's work.

## 15.2.6 / FULL-TIME GRADUATE PROGRAM FEES

(1) *General fees* are charged per session as follows:

| | |
|---|---|
| Registration | $10.00 |
| Graduate Students' Association | 2.00 |
| Students' Union Building and Students' Union privileges | 15.00 |
| University Athletic Board | 8.00 |
| Re-admission (charged to students permitted to resume an interrupted program) | 50.00 |

(2) *Instruction fees.* Except where otherwise noted, the following fees are the current total amounts for the minimum period within which it is possible for a student to complete the degree program:

| | |
|---|---|
| Qualifying year for holders of any bachelor's degree from a three-year undergraduate program (The University of Alberta or equivalent) | $500.00 |
| Master's degree, for holders of a bachelor's degree with honors, or a B.Sc. from a four-year specialized undergraduate program (The University of Alberta or equivalent) for a normal one-year program | 500.00 |
| for each additional course | 170.00 |
| Master's degree, for holders of a bachelor's degree from a four-year program changing field, or specializing for the first time, for a normal one-year program | 500.00 |
| for each additional course | 170.00 |
| Master of Education degree for which residence credit is obtained at Summer Sessions (applicable only to students in Industrial or Vocational Education or others who began their program before September, 1962) | 750.00 |
| Doctor of Philosophy or Doctor of Education degree for holders of a master's degree continuing in the same field, $500.00 a year, for two years | 1000.00 |
| Doctor of Philosophy or Doctor of Education degree for holders of a bachelor's degree with honors, $500.00 a year for three years | 1500.00 |
| To maintain continuous registration when not otherwise registered in course(s), and for all doctoral and master's candidates, per year of registration after total instruction fee has been paid | 40.00 |
| Doctor of Science or Doctor of Letters degree | 500.00 |

A normal one-year program is considered to consist of up to four full courses (or the equivalent) with or without registration for research on thesis project. In the qualifying year, a normal program is four or five courses (or the equivalent).

For fee assessment purposes, courses taken other than for credit toward a degree program will be counted in the total course work taken by a student on his program. This applies to Probationary Graduate Students as well as to candidates for degrees. Special Graduate Students will be charged $170.00 per full course to a maximum of the fee for a full year's program.

Any outstanding balance will be assessed in the student's final session.

### 15.2.7 / PART-TIME GRADUATE PROGRAM FEES

(1) *General fees* are charged per session as follows:

| | |
|---|---|
| Registration | $10.00 |
| Graduate Students' Association (optional at registration) | 2.00 |
| Students' Union, Associate Membership (intramural students only) | 5.00 |
| University Athletic Board (optional at registration) | 8.00 |
| Re-admission (charged to students permitted to resume an interrupted program) | 50.00 |

(2) *Instruction Fees.* Part-time graduate students will be charged $170.00 for each full course and $85.00 for each half-course they take, up to the amount of the total instruction fee for the full program. Part-time students are charged an additional fee of $40.00 for each registration in excess of three. Any outstanding balance will be assessed in the students' final session.

### 15.2.8 / BACHELOR OF DIVINITY PROGRAM FEE

The following fee will be charged per session to students in the Bachelor of Divinity program taking instruction in St. Stephen's College:

| | |
|---|---|
| Registration | $5.00 |

### 15.2.9 / AUDITING FEES

The fees for the privilege of auditing a course are:

| | |
|---|---|
| Full course | $12.00 |
| Half course | 6.00 |

### 15.2.10 / SUMMER SESSION FEES

Details of Summer Session fees are given in the Summer Session Calendar.

### 15.2.11 / EXAMINATION FEES

No fee is levied for *final examinations* written during regular examination periods.

A fee of $10.00 is charged for each *supplemental examination* written during a regular supplemental examination period.

For a *special supplemental examination* a fee of $40.00 is charged for each paper. Where the student has been prevented by illness or other extreme circumstance from writing at the regular time, a portion of the fee may be waived.

A fee of $5.00 is charged for each *deferred final examination* written during a regular supplemental examination period. The fee for a special deferred final examination requiring the setting of a special paper is $40.00 per paper. Where the student has been prevented by illness or other extreme circumstance from writing at the regular time, however, a portion of the fee may be waived.

An additional fee of $5.00 per paper is charged for conducting a supplemental or deferred final examination at an established centre other than Edmonton.

### 15.2.12 / SPECIAL FEES

The following special fees will be assessed in particular cases as they apply:

| | |
|---|---|
| For supplying a transcript of record | $1.00 |
| For each additional copy ordered at the same time | .50 |
| For viséing transcripts and certificates from institutions outside Alberta (not applicable to graduate students) | |
| Canadian | 5.00 |
| other | 10.00 |
| For late registration | $3.00 + 1.00 per day |
| For indexing and microfilming of doctoral thesis by the National Library of Canada | 5.00 |

### 15.2.13 / REFUNDS ON WITHDRAWAL

When a student withdraws from a course or program with the approval of his Dean, an adjustment, where applicable, will be made on a pro rata basis except that no refunds will be made if the withdrawal is subsequent to March 15. In the case of a full-time undergraduate student, an administrative charge of $10.00 will be made. In any other case, the amount of the administrative charge will be the amount of the registration fee.

A slightly different regulation applies to an extramural student who withdraws. If notice of withdrawal is received by the Registrar by November 15, all fees except the registration fee will be refunded. However, if notice of withdrawal is received by the Registrar subsequently to November 15, a pro rata charge will be made from October 1 except that no refunds will be made if the withdrawal is subsequent to March 15.

# 16 / ACADEMIC REGULATIONS

## 16.1 / *Residence Requirements*

(1) A student proceeding towards a first degree normally must attend at least one academic year and complete a full year's program.

(2) The final year of a degree program must normally be taken in attendance at The University of Alberta.

(3) If a student has fulfilled the first requirement before beginning the final year of his program, he may apply to the Dean of his faculty for permission to fulfil the second requirement by attendance at Sum-Sessions or the Evening Credit Program of of University.

## 16.2 / *Examinations*

### 16.2.1 / TERM EXAMINATIONS

(1) *Term examinations optional.* The holding of term examinations is optional with each department.

(2) *Distribution of weight.* In each course in which a final examination is held, a weight of not less than 30 per cent and not more than 70 per cent will be assigned to the final examination. The remaining weight for the course will be assigned to term work. At the beginning of the session, the instructor will announce the distribution of weight between term work and final examination in each course.

(3) *Absence from term examinations or test.* If a student has an unexcused absence from a term examination or test, the mark assigned to him will be zero. However, in case of illness or other extreme circumstance the student may be excused from writing the examination or test. In applying for exemption a student must present to his instructor an absence slip signed by the Infirmary Physician where the cause is illness, or by the Registrar where the cause is other than illness. When exemption is granted the percentage weight allotted to the examination or test missed is added to the percentage weight allotted to the final examination.

(4) *Test weeks.* Although instructors may give tests at any time at their discretion, one week in the middle of the First Term and one week between terms have been set aside as test weeks. During these weeks students will not be permitted to leave the campus to engage in extracurricular activities.

### 16.2.2 / FINAL EXAMINATIONS

(1) *Final examinations.* With certain exceptions, a final examination is held in each course. In courses completed in the First Term, final examinations may be held either during test week in December *under departmental supervision,* or at the end of the session, at the discretion of the departments concerned. All other final examinations are held at the end of the Session.

(2) *Absence from final examinations.* Any student who is ill or suffering from severe domestic affliction is advised not to sit for a final examination. Instead he should advise the Registrar at once of the circumstances and should apply for a deferred final examination to be written at the time of the regular supplementals. Simi-

lar action should be taken by any student, who, because of religious convictions or for other cogent reasons, is unable to write a final examination at the scheduled time. Such application will be referred to the student's Dean or Director for a final decision.

(3) *Cancellation of paper during examination.* If a student becomes ill or receives word of domestic affliction *during* the course of an examination, he should report at once to the Supervisor, hand in his unfinished paper, and request that it be cancelled. Thereafter, if illness is the cause, he must go directly to the Infirmary so that any subsequent application for a deferred examination may be supported by a medical certificate. The Registrar should be notified in writing of the circumstances within forty-eight hours of the examination. In certain cases, the decision may be to grant a deferred final examination, which will carry with it no supplemental privilege in case of failure.

(4) *No subsequent cancellation of papers.* Should a student write an examination, hand in his paper for marking, and later report extenuating circumstances to support a request for cancellation of his paper and for another examination, such request will not be entertained.

(5) *Debarment from final examination.* A student may be refused permission to write the final examination in a course, on the recommendation of the department concerned and with the concurrence of the Dean of his faculty, in the following circumstances:

(i) The student has an inordinate number of unexcused absences;

(ii) The student has neglected to do a substantial proportion of his written assignments in a course of which these are an essential feature;

(iii) The student has neglected to do a substantial portion of the laboratory work in a science course.

(6) *Aegrotat standing* may be granted by the Faculty Council concerned to a student registered in either of the last two years of any program, except in the final year for the B.A. degree in the combined program for the B.A., LL.B. degrees (i.e. the fourth year of the program). Any student wishing to take advantage of this privilege should apply without delay to the Dean of the faculty concerned. Any other student absent from a final examination because of illness may apply for permission to write the regular supplemental examination (see ¶ (2), above).

(7) *Examination results.* After the end of each University Session a statement of record is mailed to each student at the home address specified on his registration. This should not be expected before June 15 at the earliest.

(8) *Reappraisals.* Since great care is taken in marking final examination papers, a student should apply for reappraisal of a paper only if he has good reason to believe that a mistake has been made. Reappraisals are dealt with by the head of the department in consultation with members of the staff. A request for reappraisal must be made by letter to the Registrar (or by completion of an application form in the Registrar's Office) within thirty days after the publication of results, and accompanied by a fee of $10.00 for each paper; the fee will be refunded if the grade is raised.

It should be understood that if the grade is changed, the new grade, whether higher or lower than the original, replaces it as the student's official grade in the course. The reappraisal privilege is limited to two papers. Normally there is no such privilege for supplemental examinations. Students who have been granted the supplemental privilege and who are awaiting the outcome of a reappraisal should make application for supplemental examinations by the prescribed deadline.

## 16.2.3 / SUPPLEMENTAL EXAMINATIONS

(1) *Number of supplementals.* The number of supplemental examinations allowed to any student is determined by his faculty council. The privilege of writing supplemental examinations may be withheld by the faculty council if the student's grade in the course is very low, or if his grade-point average, including the course or courses failed, is below that required for promotion. Notification of permission to write one or more supplemental examinations is included in the statement of marks sent to each student.

(2) *Weighting of supplementals.* The percentage weight of term marks carried forward to a supplemental examination will be determined by the department and faculty concerned.

(3) *Application.* A student who has been granted the privilege of a supplemental examination must apply to the Registrar not later than the deadline shown in the Academic Schedule (above, § 11), remitting the prescribed fee (above, § 15.2.11). No late applications will be accepted.

(4) *Supplemental examination schedule.* A student must write his supplemental examinations at the time of regular supplemental examinations next following unless he has been granted an extension by his

Dean or Director. Supplemental examinations will be held in mid-August. However, a student in his graduating year who has an excused absence from, or who fails in a First-Term final examination in January may, by permission of his Dean or Director, be allowed a supplemental examination during the Second Term recess in March or at the end of the session. Application for such examination must be made at least three weeks before the commencement of the examinations. (See the Academic Schedule, § 11 above.)

(5) *Failure in supplemental examination.* A student who returns to the University having failed a supplemental examination, or having neglected to write it, will be required to repeat the course. In certain cases an equivalent course may be prescribed instead of the failed course.

(6) *Failure in graduating year.* A member of the graduating class who, having exhausted all the regular supplemental examination privileges, has still a failure in one course only, may, with the permission of the faculty council concerned, register in and repeat that course extramurally, unless, in the opinion of the department concerned, it is necessary for him to attend classes in the course a second time.

### 16.2.4 / DEFERRED AND SPECIAL EXAMINATIONS

(1) *Deferred final examinations.* A student who has missed a final examination because of illness or domestic affliction or who is obliged to absent himself from an examination for some other compelling reason (including religious convictions) may apply for a deferred final examination. Application for such examination must be made to the Registrar by the deadline prescribed in the Academic Schedule (above, § 11), must be supported by a satisfactory medical certificate in the case of illness, and must be accompanied by the prescribed fee (above, § 15.2.11). Deferred final examinations are written at the same time as the regular supplemental examinations (above, § 16.2.3, ¶ (4)).

(2) *Deferred First-Term final examinations.* A student in the Faculty of Medicine, Dentistry, or Law, or a student in his graduating year in any other faculty, who cannot take a First-Term final examination in January because of illness or other compelling reason will be granted a deferred final examination at the end of the Session. Application for such examination must be made to the Registrar by the prescribed deadline, must be supported by a satisfactory medical certificate in the case of illness, and must be accompanied by the prescribed fee.

(3) *Special examinations.* A special supplemental or a special deferred final examination may be granted to a student who is prevented by illness (attested by a physician), domestic affliction, or other extreme circumstance from writing a supplemental examination or a deferred final examination at the regular time. Application must be made to the Registrar a full month before the special examination is to be written, and must be accompanied by the prescribed fee (above, § 15.2.11). Special examinations are normally written on the Saturday following the Fall registration period. In certain approved cases they may be written during the regular examination periods in April, May, August, or September.

## 16.3 / *Grading System*

The grading system introduced at The University of Alberta in the Winter Session of 1966-67 uses the following nine grades:

| | |
|---|---|
| 9 | |
| 8 | Excellent |
| 7 | |
| 6 | Good |
| 5 | |
| 4 | Pass |
| 3 | (see Note) |
| 2 | Fail |
| 1 | |

NOTE: A grade of 3 in an individual course will be accepted by a faculty or school only if warranted by a student's over-all academic record.

In courses taken towards an undergraduate degree the minimum passing grade is 4 unless otherwise specified; in courses taken towards a graduate degree the minimum passing grade is 6. Under the percentage system previously in use, the minimum passing grade in courses taken towards an undergraduate degree was 50 per cent; in courses taken towards a graduate degree, 65 per cent.

## 16.4 / *Academic Standing*

### 16.4.1 / FIRST-CLASS STANDING

First-class standing in a given year is awarded to any student who secures a grade-point average of not less than 7.5 in the work of that year.

### 16.4.2 / DEGREES WITH HONORS

A student in the Faculty of Arts or of Science with approved qualifications may proceed to the degree of Bachelor of Arts

or Bachelor of Science with honors by following a more concentrated course of study in a special field under the supervision of one of the departments. The time required for an honors degree is four years from senior matriculation.

Honors degrees are awarded in two classes, first-class honors and honors. For first-class honors, a grade-point average of 7.5 is required; for honors, 5.5.

### 16.4.3 / DEGREES WITH DISTINCTION

The notation "With Distinction" is inscribed on the permanent record and graduate parchment of a candidate for any degree, except an honors or graduate degree, if the candidate has obtained a grade-point average of 7.5 or higher over the last two years of his program. A student who has taken part of his work at another university may be granted a degree "With Distinction" at the discretion of the faculty concerned.

### 16.4.4 / PROMOTION

Promotion regulations are set by the faculties and schools of the University. Details will be found in the sections of the Calendar relating to the particular faculties and schools.

### 16.4.5 / UNSATISFACTORY STANDING

(1) A student who has been admitted to the University with a weak matriculation record may be warned of the fact at the beginning of his first session.

(2) The records of all students are reviewed at the end of each session. A student whose record is found to be unsatisfactory will be notified by his Dean or Director and may be referred to the Student Counselling Services for recounselling. He may be denied the privilege of writing supplemental examinations and required to repeat his year. A student whose record is extremely unsatisfactory may be required to withdraw from the University.

(3) A student who has been required to withdraw from the University will not be permitted to re-enter without recounselling. Such a student seeking re-admission to the University must report his intention by letter or in person to the Director of Student Counselling Services not later than July 15.

(4) A student with an extremely unsatisfactory record at another university will not be considered for admission to The University of Alberta until at least a year has elapsed from the date of his leaving his former university. Thereafter, the procedure outlined in ¶ (3) will apply.

(5) Subject to the control of the General Faculty Council, a faculty or school council may refuse permission to a student or prospective student to enter any year of a program if, in the opinion of the council, the student shows a lack of general educational attainment. Moreover, a student whose record in the classroom, in tests, or in final examinations is unsatisfactory may be required to withdraw from the faculty or school at any time.

### 16.4.6 / SCHOLASTIC STANDING AND EXTRACURRICULAR ACTIVITIES

To be eligible to represent the University in any competition with outside organizations, or to participate in non-competitive University activities which are open to the general public, or to hold office in a student organization, a student must be a bona fide student and must meet the requirement of satisfactory scholastic standing.

A bona fide student is one who is (1) carrying a full year's undergraduate work in the University, or (2) carrying a full year's graduate work and in attendance at Edmonton, or (3) a student at an affiliated college carrying a full year's work leading to a diploma or certificate and taking two full courses of University grade in the University.

A bona fide student may assume that he is scholastically eligible to participate in the activities mentioned above unless he is informed otherwise by his Dean or Director. However, a man student desiring to participate in events sponsored by the Western Canadian Intercollegiate Athletic Union must meet the requirements of scholastic standing laid down by that body.

If a student is in doubt about his eligibility to participate, he should consult the Dean of his faculty or the Director of his school as soon as possible.

## 16.5 / *Attendance*

(1) Regular attendance is expected of students in all courses. At the recommendation of the department concerned, and with the concurrence of the Dean, any student having an inordinate number of unexcused absences from a course may be refused permission to take the final examination.

(2) A student who is absent from two or more consecutive classes in a course because of illness or disability should report to his instructor upon his return to class.

(3) A student who is absent from two or more consecutive classes in a course for some valid reason other than illness should report to his instructor upon his return to class.

If the instructor requires an absence slip, it will be the student's responsibility to have one signed by the Registrar and to show it to the instructor.

(4) A student desiring leave of absence in any given course must communicate his desire to the Registrar. At the end of such a period of absence, the student must present an absence slip for the Registrar's signature.

## 16.6 / *Physical Education*

All first-year students, with the exception of (1) those declared physically unfit by the University Health Services and (2) students over twenty-five years of age, are required to take two hours of Physical Education per week in the appropriate course arranged by the Faculty of Physical Education.

## 16.7 / *Appeals and Grievances*

A student who wishes to appeal against a ruling which affects him adversely may do so by addressing his appeal to the Dean of his faculty or the Director of his school, who will transmit it to the faculty or school council or to the executive committee concerned. The General Faculty Council has power to hear and determine appeals from the decisions of faculty councils and executive committees. A student who wishes to make such an appeal should address it to the Registrar, who will transmit it to the General Faculty Council.

Student grievances of an academic nature sometimes arise. Such grievances should be directed in the first instance to the instructor concerned. Normally, satisfaction will be obtained. However, recourse is available to department heads, Deans or Directors, and the President, in that order. In appropriate cases the department head or Dean or Director may refer the matter to the faculty or school council, from which an appeal may be taken to the General Faculty Council.

Grievances may affect a student as an individual or as a member of a class. Where the class as a whole is affected, the student should try to determine the feelings of the class before making any formal complaint.

Members of the academic staff are willing to discuss academic problems with students, and help them to the best of their ability.

## 16.8 / *Academic Costume*

All gowns are to be of the customary Cambridge shape, i.e., for undergraduates, a gown of black material not falling below the knee with round sleeves cut above the elbow; for bachelors, a gown of black material falling below the knee with full sleeves cut to the elbow and terminating in a point; for masters, doctors of medicine and doctors of dental surgery a gown of black material falling below the knee with black sleeves with semi-circular cut at bottom.

Hoods are to be of the Oxford pattern, and of spruce green material.

The bachelor's hood is to have a border (1½ inches wide), the master's a full lining, of the color distinctive of the faculty. The M.D. and D.D.S. hoods are to be of the master's pattern.

The faculty colors are:

| | |
|---|---|
| Arts (including LL.D.) | White |
| Science | Gold-yellow |
| Agriculture | Pale Blue |
| Commerce | Silver Grey |
| Dentistry | Maroon |
| Divinity | Purple |
| Education | Royal Blue |
| Engineering | Light Green |
| Household Economics | Pink |
| Law | Scarlet |
| Library Science | Lemon |
| Medicine | Crimson |
| Nursing (B.Sc.) | Crimson and White |
| Pharmacy | Cinnamon |
| Physical Education | Royal Blue and Gold |

Doctor's gowns (Ph.D., Ed.D., D.Sc. and D.Litt.) are to conform to the Intercollegiate Code in design. They are to be of black material and the velvet trim is to be Philosophy blue for the Ph.D., Education light blue for the Ed.D., Science gold-yellow for the D.Sc. and Letters white for the D.Litt. Doctors of Laws are entitled to wear a full-dress scarlet robe faced with white silk.

All doctor's hoods (Ph.D., Ed.D., D.Sc. and D.Litt.) are to conform to the Intercollegiate Code in shape, size and color. They are to be of black material to match the gown, and the full lining is to be of gold satin with a six-inch green satin chevron. The velvet trim distinguishes the four degrees and matches the velvet trim on the gown. There is to be a narrow green piping where the gold lining joins the black material. The LL.D. hood is of scarlet silk and of the Cambridge form and has a full lining of white silk.

All caps are to be of the ordinary black trencher shape with black tassels, with a black velvet cap with gold cord for LL.D. full dress.

## 16.9 / *Graduation*

On the recommendations of the faculty council, degrees are conferred by the Chancellor of the University at a Convocation of the faculty, alumni, graduands, and their guests. Convocations for the conferring of degrees are normally held in the spring and fall of each year.

Graduands who are unable to be present at Convocation are required to give notice in writing of their intention to be absent. This notice must be received by the Registrar by the date and hour indicated in the Academic Schedule. Any student who fails to give notice as required will be assessed a penalty of $10.00 prior to release of his or her parchment. A graduand may be excused from the payment of this fee if his absence without notice is due to sudden illness, accident, domestic affliction, or other reason deemed valid by the Registrar.

# 17 / STUDENT CONDUCT AND DISCIPLINE

## 17.1 / *General Information*

When a student enters the University, it is expected that he will apply himself to his studies and conduct himself with propriety. Should a student fail to live up to these expectations, the University reserves the right to take such action as, in its opinion, his case warrants. The penalty of expulsion may be applied.

General responsibility for student discipline rests with the General Faculty Council, which has delegated its powers to the Deans' Council. The Provost of the University, who is secretary of the Deans' Council and chairman of the Council on Student Affairs, exercises day-to-day supervision over the conduct of students. He works in co-operation with the Dean of Men, the Dean of Women, the Foreign Student Adviser, and the Wardens of Residence. The Wardens, in conjunction with the elected students' committees in the residences, are responsible for the everyday supervision and conduct in the halls of residence.

The Students' Union is concerned with matters of student discipline and is, as a

*The President addressing Convocation*

matter of policy, given the first opportunity to deal with most disciplinary issues that may arise. For this purpose it has set up a Disciplinary Board. The Deans' Council and the Board of Governors reserve the right to deal with certain matters, such as dishonesty in examinations.

## 17.2 / *Special Regulations of the Board of Governors*

(1) All interference on the part of any student with the personal liberty of another or any conduct on the part of any student subjecting another student to any indignity or personal violence is forbidden. No initiation ceremony involving physical violence, hazing, personal indignity, interference with personal liberty or destruction of property may be held within the buildings or on the grounds of the University, such student activities being expressly forbidden under penalty of suspension or expulsion. The University authorities will not be responsible for any accident or illness of any kind occasioned to any student while engaged in or being subjected to any such activities.

(2) In the case of dishonesty or any serious indiscipline in the classroom, the instructor has the authority of suspension from the classroom. Further action is to be taken by a committee consisting of the Provost and the department and Dean concerned.

(3) The unauthorized use of, or possession of, liquor on University premises, including residences, is prohibited.

NOTE: Authorization for exceptions to this general prohibition must be received from the President. Each case will be treated individually on its merits.

(4) The Board of Governors considers the raiding or unlawful entry of residences as a very grave offence. Any such occurrence will be reported to and dealt with by the Board.

# 18 / STUDENT SERVICES AND STUDENT AFFAIRS

## 18.1/ *Student Government*

The principal means of student self-government at the University are the democratically constituted Students' Union and Graduate Students' Association. All registered students become members of the appropriate organization on payment of their General fees. Liaison between the student body, the academic staff, and the administration is provided by the Council on Student Affairs, of which the Provost is chairman, and which has a membership drawn from all three groups.

The General Faculty Council, to which the Council on Student Affairs is answerable, is responsible for the general supervision of student affairs and student conduct and includes three representatives of the student body in its membership.

Students are also represented on the University Senate and on many standing committees.

Students in residence elect self-governing committees which are independent of the Students' Union where matters relating to the internal life of the residences are concerned.

See the *Student Handbook* for full information.

## 18.2 / *Student Services*

### 18.2.1 / THE STUDENT COUNSELLING SERVICES

The Student Counselling Services of the University offer counselling to students and to prospective students throughout the year. Vocational testing is available. Other testing is also available at the discretion of a counsellor. Among the concerns of the Student Counselling Services are the following:

*Study skills.* A series of tutorials designed to improve study skills is arranged during the session. Individual counselling is also available.

*Vocational planning.* A counsellor may be consulted about future plans, including future professional training.

*Personal problems.* Sometimes a student's performance suffers because of worry, restlessness, inability to concentrate, or preoccupation with personal problems. In such circumstances counselling should be sought.

*Change of faculty.* A student contemplating a change of faculty may consult a counsellor. Preferably, such consultation should take place as early as possible before the beginning of the next University session.

*Withdrawal from university.* A student who, for any reason, is contemplating with-

drawal should arrange for an interview with a counsellor, and subsequently with his Dean or Director.

*Unsatisfactory standing.* A student whose academic standing is unsatisfactory is advised to seek counselling, and in cases of extremely unsatisfactory standing, is required to do so by his faculty or school council.

Prospective students may write to the Student Counselling Services for the booklet *Information for Prospective Students,* which has been prepared to answer the most commonly asked questions about university life and work. They also receive individual counselling, for which it is necessary to make an appointment in advance.

Inquiries should be addressed to Student Counselling Services, The University of Alberta, Edmonton (telephone 432-3772).

## 18.2.2 / THE STUDENT HEALTH SERVICE

All full-time students are entitled to medical treatment by the University's Student Health Service under conditions which are outlined in a brochure supplied to all registered full-time students.

*New Students' Union Building, planned and financed by the students themselves*

## 18.2.3 / THE STUDENT AWARDS OFFICE

The Student Awards Office administers not only University awards but also those made under the Students' Assistance Act and the Canada Student Loans Plan. For further information, see the Awards section of the Calendar (below, §§ 221-228).

## 18.2.4 / HOUSING AND FOOD SERVICES

*Residences*—The University is currently able to provide room and board for about 2,150 students in its halls of residence. Applications for reservations, accompanied by thirty dollars ($30.00), should be addressed to the Housing Office, Lister Hall, The University of Alberta, Edmonton. Reservations will not be held after the period of registration. A student who makes application for and is assigned rooms must understand that by so doing he is obligating himself to remain in residence during the entire academic session.

Charges for room and board are made at the following rates:

ROOM AND BOARD: $733.15 per Winter Session.

ROOM ONLY: $294.00 per Winter Session.

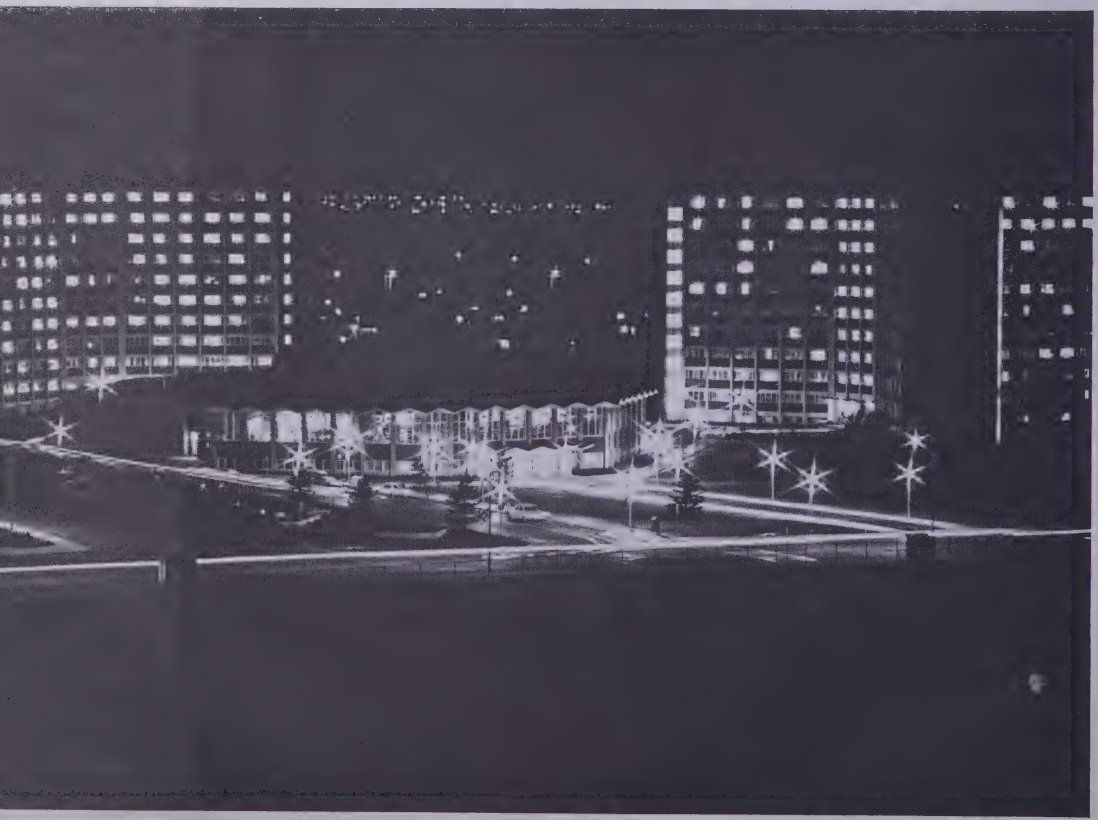
Payment may be made in one or two instalments. If payment is to be made in one instalment it is due on check-in at the beginning of the session. If payment is to be made in two instalments the first is due on check-in and the second on January 10.

When special permission has been given by the Director of Housing and Food Services, payment may be made monthly, each payment being due on the first day of the month. A penalty of 50 cents per day to a maximum of $5.00 per month will be assessed on arrears after the tenth of the month.

A student who plans to remain on full room and board during the Christmas vacation should notify the Housing and Food Services office of his intention. There will be a charge of $14.00 for board during the vacation period.

The University reserves the right to change the above regulations, rates, and schedules of payment without notice.

A limited amount of residential accommodation for men students is available in St. Stephen's College and St. Joseph's College. Details may be secured by writing directly to the colleges.



*Lister Hall (centre) and the residence towers, Anthony Henday Hall and Henry Kelsey Hall*

*Married Student Housing*—The University provides housing for a limited number of married students at Michener Park, approximately three miles from the University campus. Each housing unit consists of two bedrooms, living room, dining room, bathroom, and storage space. The rental charge includes all utilities with the exception of telephone service. Applications should be submitted to the Housing and Food Services office as early as possible before the session.

*The Student Housing Service*—The Student Housing Service of the University prepares lists of rooms available to students prior to both the Winter and Summer Sessions. These lists are displayed in Lister Hall for consultation by students. As the lists change daily, no attempt is made to send them out by mail.

The University cannot accept responsibility for finding suitable accommodation for students.

### 18.2.5 / STUDENT PLACEMENT OFFICE

The Canada Manpower Centre maintains a Student Placement Office, located on the fourth floor of the Students' Union Building, to help students find permanent, part-time, or summer employment. Students seeking summer jobs are advised to register well before the end of the Second Term. Graduating students should register at the beginning of their final year, because interviews with prospective employers begin in the early autumn and continue throughout the session. In addition, Canada Manpower counsellors conduct vocational counselling, and the Centre is happy to advise or assist students at any time without obligation. Additional information may be obtained by telephoning 432-4291.

### 18.2.6 / BOOKSTORE

The University maintains a large and modern bookstore in the Students' Union Building, where prescribed textbooks and supplies of all kinds may be purchased by students at special prices. The bookstore also stocks a wide range of books and other items of special interest to students and faculty.

## 18.3 / *Athletics*

### 18.3.1 / INTRAMURAL SPORTS

The Faculty of Physical Education, with the co-operation of the University Athletic Board, organizes and administers a comprehensive program of intramural sports. Individual and group sports for men and women include tennis, golf, track and field, cross-country running, basketball, hockey, volleyball, touch football, table tennis, swimming and figure skating. Facilities include gymnasium, swimming pool, ice arena and outdoor playing fields.

### 18.3.2 / INTERCOLLEGIATE SPORTS

As a member of the Western Canada Intercollegiate Athletic Association, the University provides opportunities for men and women to compete in intercollegiate sports. Included in the activities for men are golf, tennis, cross-country, badminton, volleyball, basketball, football, hockey, wrestling, swimming and curling. Women compete in tennis, golf, and badminton and hold two sports weekends with member universities. Basketball and curling are played during one weekend and volleyball, swimming and figure skating during the other.



*The University's new Bookstore, in the Students' Union Building*

*Dr. W. P. Skoropad, Assistant Dean of Agriculture, and Dr. C. F. Bentley, Dean (until summer 1968).*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# *Faculty of Agriculture*

## 31 / INTRODUCTORY

### 31.1 / *Members of the Faculty*

#### 31.1.1 / OFFICERS OF THE FACULTY

*Dean*

C. F. BENTLEY, Ph.D. (to Summer 1968)

*Assistant Dean*

W. P. SKOROPAD, Ph.D.

#### 31.1.2 / DEPARTMENT OF AGRICULTURAL ECONOMICS

*Professor and Head*

T. W. MANNING, Ph.D. (Marketing Policy)

*Professor*

H. C. LOVE, Ph.D. (Production Economics and Statistics, Agricultural Policy; on leave 1968-69).

*Associate Professors*

E. R. BERG, Ph.D. (International Economics, Prices)
T. A. PETERSEN, M.A. (Farm Management and Extension)
W. B. ROGERS, Ph.D. (Land Economics, Marketing, Rural Sociology)
W. M. SCHULTZ, Ph.D. (Production Economics, Farm Management, Comparative Agricultural Economics)

*Assistant Professors*

L. P. P. APEDAILE, B.Sc. (Rural Development)
M. H. HAWKINS, Ph.D. (Marketing, Business Management)
D. G. MURRI, M.Sc. (Rural Sociology)
A. A. WARRACK, Ph.D. (Marketing, Foreign Agriculture)
W. E. PHILLIPS, Ph.D. (Resource Development)

#### 31.1.3 / DEPARTMENT OF AGRICULTURAL ENGINEERING

*Professor and Head*

F. V. MacHARDY, Ph.D. (Economics of Mechanization, Operations Research Applications, Farm Structures)

*Associate Professors*

H. P. HARRISON, B.Sc. (Farm Machinery)
T. A. PRESTON, M.A. (Work Study, Production and Industrial Engineering, Operations Research)
B. T. STEPHANSON, M.Sc. (Power, Machinery and Materials Handling, and Processing)
J. B. McQUITTY, M.S. (Farm Buildings)

#### 31.1.4 / DEPARTMENT OF ANIMAL SCIENCE

*Professor and Head*

L. W. McELROY, Ph.D. (Beef Cattle)

*Professors*

R. T. BERG, Ph.D. (Animal Genetics)
J. P. BOWLAND, Ph.D. (Animal Nutrition, Swine; on leave 1968-69)
D. R. CLANDININ, Ph.D. (Poultry Nutrition)
A. R. ROBBLEE, Ph.D. (Poultry Nutrition)

*Associate Professor*

R. T. HARDIN, Ph.D. (Poultry Genetics)

*Assistant Professors*

W. COMBS, Ph.D. (Animal Genetics)
C. M. GRIEVE, Ph.D. (Animal Nutrition, Dairy Cattle)
L. P. MILLIGAN, Ph.D. (Animal Biochemistry)
A. J. F. WEBSTER, Ph.D. (Animal Physiology)
B. A. YOUNG, M.Sc. (Animal Physiology)

#### 31.1.5 / DEPARTMENT OF ENTOMOLOGY

*Professor and Head*

B. HOCKING, Ph.D. (General Entomology, Physiology, Histology, Medical Entomology; on leave 1968-69)

*Professor and Acting Head*

G. E. BALL, Ph.D. (Taxonomy, Systematics, Morphology, Evolution, Zoogeography)

*Associate Professor*

W. G. EVANS, Ph.D. (Ecology, Ethology, Applied Entomology, Toxicology)

*Assistant Professors*

D. A. M. CRAIG, Ph.D. (Morphology)
R. H. GOODING, Sc.D. (Insect Biochemistry, Toxicology)
B. S. HEMING, Ph.D. (Taxonomy and Morphology)

#### 31.1.6 / DEPARTMENT OF FOOD SCIENCE

*Professor and Head*

L. F. L. CLEGG, Ph.D., D.Sc. (Dairy and Food Microbiology; on leave 1968-69)

*Associate Professor and Acting Head*

F. W. WOOD, M.Sc. (Dairy and Food Processing)

*Associate Professor*

J. M. deMAN, Ph.D. (Dairy and Food Chemistry)

*Assistant Professors*

H. JACKSON, Ph.D. (Dairy, Food and Industrial Microbiology)
G. J. K. PACKER, Ph.D. (Food Engineering)

*Research Associate*

J. G. ARMSTRONG, Ph.D. (Dairy Science)

#### 31.1.7 / DEPARTMENT OF PLANT SCIENCE

*Professor and Head*

W. G. CORNS, Ph.D. (Vegetation Control)

*Professor and Acting Head*
W. P. SKOROPAD, Ph.D. (Plant Diseases)

*Professors*
MARY S. SPENCER, Ph.D. (Plant Biochemistry)
S. ZALIK, Ph.D. (Plant Physiology and Morphogenesis, Cereal Chemistry)

*Associate Professors*
W. T. ANDREW, Ph.D. (Vegetable Crops)
N. COLOTELO, Ph.D. (Host Parasite Relationships)
R. H. KNOWLES, M.Sc. (Landscape Architecture, Turf and Woody Ornamentals)
W. H. VANDEN BORN, Ph.D. (Herbicides and Weed Physiology)

*Assistant Professors*
A. W. BAILEY, Ph.D. (Herbicides)
C. HIRUKI, Ph.D. (Virology)
C. T. PHAN, D.Sc. (Plant Physiology)
E. W. TOOP, Ph.D. (Floriculture)

### 31.1.8 / DEPARTMENT OF SOIL SCIENCE

*Professor and Head*
J. A. TOOGOOD, Ph.D. (Soil Physics)

*Associate Professors*
F. D. COOK, Ph.D. (Soil Microbiology)
S. PAWLUK, Ph.D. (Soil Genesis and Classification)
J. A. ROBERTSON, Ph.D. (Soil Chemistry)
G. R. WEBSTER, Ph.D. (Soil Chemistry; on leave 1968-69)

*Assistant Professors*
M. P. K. NYBORG, Ph.D. (Soil Fertility)
D. J. PLUTH, Ph.D. (Soil Classification and Land Use)

### 31.1.9 / ADDITIONAL MEMBERS OF FACULTY COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Professors*
A. T. ELDER, Ph.D. (English)
W. E. HARRIS, Ph.D. (Chemistry)
J. H. WHYTE, Ph.D. (Botany)

*Associate Professors*
R. C. JACKA, M.Sc. (Mathematics)
R. F. RUTH, Ph.D. (Zoology)

*Representative*
A. M. WILSON, M.Sc., Alberta Institute of Agrologists

*Other Member*
G. R. WHENHAM, D.V.M., Lecturer in Veterinary Medicine

*Registrar of the University*
A. D. CAIRNS, B.A.

## 31.2 / *General Information*

The Faculty of Agriculture was established at The University of Alberta in 1915 and the first students to receive the degree of Bachelor of Science in Agriculture (B.S.A.) graduated in 1918. The present B.Sc. degree was first given in 1924.

The four-year program in Agriculture is a professional one, providing education in many facets of the science of agriculture. The Faculty has under its direct administration the Departments of Agricultural Economics and Farm Management, Agricultural Engineering, Animal Science, Entomology, Food Science, Plant Science, and Soil Science. Many of the courses which are fundamental to the science of agriculture are given in other departments of the University, since the underlying scientific principles are the same as in any other field. It is the function of the departments in this Faculty to apply these principles to the solution of agricultural problems and to seek, through research, new information.

A modified first year in Agriculture may be taken at The University of Calgary by registering in the program listed later in this Calendar. A rather similar modified program is also offered at affiliated junior colleges. The second, third and fourth years in Agriculture are offered at The University of Alberta only.

Two years of pre-Veterinary Medicine may be taken at The University of Alberta with a view to applying for admission to the four-year program in Veterinary Medicine at the University of Saskatchewan, Saskatoon. (See special program, § 33.3 below.)

The departments in the Faculty also offer advanced degrees, and carry on extensive programs of research. The Departments of Animal Science, Plant Science, and Soil Science operate experimental farms used in the teaching and research programs of these Departments. All departments have space and facilities for laboratory research.

Graduates of the Faculty are engaged in teaching, research, extension, and administrative work related to agricultural production, marketing, and processing; in the manufacture and distribution of such essentials as feeds, fertilizers, and machinery; in the handling of agricultural products; and in farming. In recent years an increasing number of agricultural industries have offered attractive opportunities for graduates of this Faculty.

## 32.1 / *Admission*

Admission requirements of the Faculty of Agriculture are set out in §§ 13.1 and 13.2 of the University Regulations section of the Calendar.

## 32.2 / *Academic Standing*

(1) Inasmuch as a rigid year system is not followed in the Faculty of Agriculture, promotion from year to year is made by the Faculty Council upon the recommendation of the Agricultural Revisions Committee.

(2) In general, promotion to the third year in Agriculture will be granted only to students who have passed all first and second year subjects required. It may also be granted when a student has passed, in the first two years, nine full courses or equivalent and has attained in them a grade-point average of at least 5.0. A student who has been promoted with a deficiency must make up the deficiency in order to complete the requirements for the degree.

(3) In any year, a student will not be allowed to write supplemental examinations in more than two full courses, or the equivalent.

(4) During his entire program, a student will not be allowed to write supplemental examinations in more than three full courses, or the equivalent, whether for the purpose of obtaining passing marks or of raising his average to the required level.

(5) A student who is repeating a year will be granted no supplemental privileges in the courses taken in that year and must pass all courses with a grade-point average of at least 5.0 in order to be allowed to continue.

(6) The privilege of repeating a year will be granted to a student not more than once during his candidacy for a degree in the Faculty, unless by special permission of the Faculty Council.

## 32.3 / *Curriculum and Graduation*

(1) After successful completion of the requirements of the first and second year, students must complete a minimum of ten full courses or equivalent in addition to Agriculture 451, which is a requirement in the fourth year. They must obtain a grade-point average of not less than 5.0 in those ten courses.

(2) A mid-September field trip of approximately one week that normally will be taken at the student's expense prior to registration in his third or fourth year is a requirement for graduation unless the student has been specifically exempted from this requirement. Details are given to the students concerned in March or April each year. Those desiring exemption should make application to the Dean's Office as early as possible, but before August 20 at the latest.

(3) The program for the B.Sc. degree in Agriculture must conform to the descriptions in § 33.1 below. All third- and fourth-year students must obtain approval for their program from the Registration Committee of the Faculty. Students are reminded, however, of the regulation that the student is responsible for the completeness and accuracy of his registration.

(4) Fourth-year students having advance senior credit must normally register for a program of five full courses or equivalent including "extras". Students may, under advice, register for additional courses up to a maximum of six full courses or equivalent in any one year. This total may not be exceeded except by special permission of the Dean of the Faculty. *In order to exclude courses in excess of the minimum requirement from the contract for graduation, the student must designate such courses as "extras" at the time of registration for the final year.*

(5) Withdrawal from a course can be made only by arrangement with the Dean or the Registration Committee before December 1 in the case of First Term courses, or before March 1 in the case of Second Term or full year courses.

## 32.4 / *Transfer from Other Universities*

Students transferring from other universities will normally be required to take, as a minimum, the equivalent of a regular senior year in attendance at The University of Alberta before the degree of B.Sc. in Agriculture will be granted.

*Greenhouses are used for tropical plants as well as less exotic species*

## 33.1 / *The Degree of B.Sc. in Agriculture*

### 33.1.1 / GENERAL INFORMATION

(1) The Faculty of Agriculture offers courses leading to the degree of Bachelor of Science in Agriculture.

(2) Most of the first-year program for this degree consists of courses required of all students.

(3) Some course areas are also required of all students during second year, but some may be chosen at the option of the individual student. Beginning in this year students may follow a general program providing a broad training in agriculture or a specialized program in one of several fields of agriculture. Students planning to specialize in a particular field should choose the second-year options recommended for their specialized program (as described below).

(4) Students entering their third year who plan to follow the general program should consult the Registration Committee of the Faculty. To obtain their degree they must take courses in at least five departments of the Faculty, and they must take at least ten half-courses or the equivalent in those departments. Their program must be approved by the Registration Committee before they can register.

(5) Students entering their third year who plan to follow a specialized program must consult the department in which they plan to specialize, and it is highly desirable for them to work out a tentative program for both their third and fourth years at this time. They must take courses in at least three departments of the Faculty other than the department in which they are specializing, and they must take at least six half-courses or their equivalent in those three departments. Their program must be approved both by the department in which they are specializing and the Registration Committee of the Faculty before they can register.

(6) The Faculty may for adequate reasons permit students to register in more or fewer courses in a given academic year than their program normally entails. This may result in decreasing or increasing the length of time to graduation.

(7) Students in the second, third and fourth years may always obtain guidance and assistance in selecting and registering for their courses from members of the Registration Committee of the Faculty. The Dean of the Faculty will be pleased to confer with students at any time.

### 33.1.2 / COURSES REQUIRED IN THE FIRST YEAR

The following courses are required in the first year (unless deferred to the second year by special permission):

(1) Agriculture 202 (First Term) and Agriculture 203 (Second Term)
(2) Either Biology 130 (for those lacking Biology 30) or an approved option
(3) Either Chemistry 130 (for those lacking Chemistry 30) or Chemistry 230
(4) Economics 200
(5) English 210
(6) Mathematics 240 (First Term) and Statistics 241 (Second Term)
(7) Physical Education 218 (men) or Physical Education 228 (women)

### 33.1.3 / COURSES REQUIRED IN THE FIRST OR SECOND YEAR

Courses taken in the first and second year must include the following:

(1) Chemistry 230
(2) Two courses from among:
  (i) the biological sciences (courses or combinations may include Biology 230, Botany, Entomology, Genetics, Microbiology and Zoology);
  (ii) the physical sciences (courses or combinations from Chemistry, Computing Science, Geology, Mathematics, Physics, Statistics);
  (iii) the social sciences (courses or combinations from Economics, Geography, History, Psychology, Philosophy, Sociology, etc.)
(3) Additional courses as necessary to give a minimum of ten full courses or the equivalent in addition to Agriculture 202 and 203 during the first two years.

### 33.1.4 / MODIFIED FIRST YEAR AT CALGARY AND ELSEWHERE

Students at The University of Calgary, and at affiliated junior colleges (see Note B) may take a substantially modified first-year Agriculture program. This, however, reduces the opportunity to take elective courses in the second year. The second, third and fourth years of the Agriculture program are offered only at The University of Alberta.

The modified first year consists of:

(1) Economics 200
(2) English 240
(3) Physical Education 218 or 228.
(4), (5) and (6) Three full courses or equivalent from among:
  (i) preferred courses:
    (a) Biology 200 (see Note A)
    (b) Chemistry 230 *or* 250
    (c) Mathematics 211
  (ii) alternative courses (not more than two of these may be offered):
    (a) Business 201
    (b) Geography 201
    (c) Geology 201
    (d) Physics 100 *or* 200

(e) Philosophy 241
(f) Political Science 200
(g) Sociology 202
(h) A language other than English

NOTE A. Students who already have credit for Biology 30 should not take Biology 200, as no additional credit will be given for it on transferring to The University of Alberta.

NOTE B. Courses taken at junior colleges should correspond to The University of Alberta courses as listed in §§ 313.1.2 and 33.1.3 as closely as possible.

Students who have taken this modified first year must complete the first- and second-year requirements of the Faculty of Agriculture during their second year which is taken at Edmonton. In addition to Agriculture 202 and 203 in which examinations are not required, they must meet the requirements listed in §§ 33.1.2 and 33.1.3 unless they present equivalent credit.

### 33.1.5 / SPECIALIZATION IN AGRICULTURAL ECONOMICS

The Department of Agricultural Economics offers programs in General Agricultural Economics, Agricultural Business, Farm and Ranch Management, and Rural Social and Economic Development. Any of these programs may be taken jointly with a major or minor subject in certain other departments. Further information may be obtained from the Department.

*Second-year preferred electives.* Agricultural Economics 367; Economics 300 or 301; an approved mathematics or statistics course; Rural Sociology 300 and 356.

*Third and fourth years.* Students should consult the Department respecting their program of courses.

### 33.1.6 / SPECIALIZATION IN AGRICULTURAL MECHANIZATION

The Department of Agricultural Engineering offers a specialized program in Agricultural Mechanization.

*Second year.* The program should include Mathematics 340 and Statistics 341, as well as Agricultural Engineering 200 or Mechanical Engineering 152 and 153.

*Third and fourth years.* An approved full-course equivalent in Mathematics or Computing Science; Agricultural Engineering 401; four additional half-courses in Agricultural Engineering; electives to a minimum of five full courses a year.

### 33.1.7 / SPECIALIZATION IN ANIMAL OR POULTRY SCIENCE

The courses listed below are recommended for most students. Those who desire a specialized program, or who anticipate proceeding to graduate study, are advised to consult with a staff member in their area of specialization.

*Second year.* Microbiology 201, Genetics 360, Biology 230, Chemistry 350.

*Third and fourth years.*

LIVESTOCK MAJORS—A minimum of six half-courses are required from among: Animal Science 300, 310, 468, 469, 484, 485, 491; Poultry Science 455.

POULTRY MAJORS—A minimum of six half-courses are required from among: Poultry Science 352, 453, 455, 459, 460; Animal Science 300, 310, 468, 484, 491.

*Electives.* Approved electives to a total of at least twenty half-courses, or the equivalent, are required. These may include additional courses offered by the Department; normally they should include courses from three of the following areas: Agricultural Economics, Agricultural Engineering, Plant Science, and Soil Science. In addition, consideration should be given to including a course in Computing Science.

### 33.1.8 / SPECIALIZATION IN ENTOMOLOGY

Students are advised to take Biology 30 in High School, Zoology 350 in first year and Entomology 302 in second year; students entering without Biology 30 should take Biology 130 in first year, Zoology 350 in second year and Entomology 302 in third year. Normally Entomology 317 and 318 should be taken in the third year and Entomology 527 and 528 in the fourth year. Entomology 471 and 476 may be taken in the fourth year.

### 33.1.9 / SPECIALIZATION IN FOOD SCIENCE

The Department of Food Science offers a program with the following minimum course requirements (prerequisites are italicized).

*Second year. Microbiology 360;* Milk Production 241 (or a suitable alternative).

*Third year. Biochemistry 300* or *Plant Physiology and Biochemistry 431, 432;* Food Chemistry 475; Dairy Chemistry 476; Food Microbiology 465; Principles of Food Processing 250.

*Fourth year.* Dairy Microbiology 466; Dairy Processing 353.

A double major including Food Science in conjunction with any other major program can be taken subject to the approval of the head of the other department concerned. A major in Food Science in conjunction with a general program can be taken subject to the approval of the Dean of the Faculty.

Modified programs or additional courses in Food Science may be taken to suit individual student requirements and to meet

timetable difficulties, subject only to normal Faculty requirements. Students desiring further information are invited to consult the Department.

### 33.1.10 / SPECIALIZATION IN GENETICS

The Department of Genetics is active in the study of cytology, cytogenetics, microbial genetics, biochemical genetics, biometrical genetics, radiation genetics, genetics of parasitism, and field crops and plant breeding.

*Second year preferred options.* Genetics 351 or Microbiology 201 and Genetics 360.

*Third and fourth years.* Students may specialize in Genetics or in Field Crops and Plant Breeding. They should consult with the head of the Department respecting their course programs.

### 33.1.11 / SPECIALIZATION IN PLANT BREEDING AND PLANT PATHOLOGY

A combined program in Plant Breeding and Plant Pathology is offered jointly by the Departments of Genetics and Plant Science. Interested students are advised to consult the head of one of these Departments.

### 33.1.12 / SPECIALIZATION IN PLANT SCIENCE

The Department of Plant Science is composed of four divisions: Horticulture; Plant Pathology; Plant Physiology and Biochemistry; and Weed Science and Crop Ecology. Students may follow a program of general Plant Science or specialize in one of these fields of study.

*Second year preferred options.* Microbiology 201 and Genetics 360; Biology 230; Chemistry 350 or 250.

*Third and fourth years.* Students should consult with the head of the Department or with the faculty members in charge of the various divisions.

### 33.1.13 / SPECIALIZATION IN SOIL SCIENCE

The Department of Soil Science is active in the study of soil chemistry, soil fertility, soil genesis and classification, interpretive classification, soil microbiology, soil physics, and soil conservation.

*Second year preferred electives.* Microbiology 360; Soils 240 and 250; Geology 201 or 202; Chemistry 350.

*Third and fourth years.* Soil Science 420, 430, 460, and at least one of Soils 421, 425, 450, 470 and 480; electives to meet the requirements for a specialized program. The Department provides a detailed listing of the courses in other departments of the Faculty and in other faculties acceptable as electives.

## 33.2 / *Inter-Disciplinary B.Sc. Program in Food Science*

A four-year inter-disciplinary program in Food Science is offered co-operatively by the Faculty of Agriculture, the School of Household Economics, and the Faculty of Science. It allows students to specialize in this expanding field more than is possible in the third- and fourth-year specialized program in Food Science offered by the Faculty of Agriculture, or the Foods and Nutrition program offered by the School of Household Economics.

The program is administered by a committee consisting of the Deans of the Faculties of Science and Agriculture (or their representatives), the Director and a faculty member of the School of Household Economics, and the head of the Department of Food Science, who acts as the co-ordinator of the program. Students in the program are, for administrative purposes, registered in the Faculty of Agriculture.

The outline of the program is as follows:

*First Year*: Biology 130 (for those lacking Biology 30) or an approved option; Chemistry 230 and 250; English 210; Food Science 200 (attendance, but not examination, required); Mathematics 180 or 201 (or 100 for those lacking Mathematics 30); Physical Education 218 or 228.

*Second Year*: Biochemistry 300; Chemical Engineering 224; Food Science 250; Mathematics 180 or 201 or an approved option; Microbiology 360; Physics 100 or 200.

*Third Year*: Chemistry 312 and 370; Food Science 451, 465, 466, 475; an approved option.

*Fourth Year*: Agricultural Engineering 406; Food Science 452, 474, 480, 481, 561; Household Economics 458; an approved option.

The following points should be noted:

(1) *Admission.* The program is designed so that students may register in it immediately on entering University or may transfer from the Faculties of Agriculture or Science or the School of Household Economics after their first or possibly after their second year. The matriculation requirements for those entering the program from high school are set out in § 13.2.2 of the University Regulations section of the Calendar.

(2) *Promotion.* Promotion from year to year will be decided by the Inter-Disciplinary Committee, but in general the requirements for promotion will be similar to those of the Faculty of Agriculture.

(3) *Graduation.* The Inter-Disciplinary Committee will serve as a revisions committee, but the actual approval of a candidate for the degree will be by the council of the faculty or school in which he has taken the predominant part of his work.

(4) *Scholarships.* Details of scholarships for which students in the program are eligible are listed under the Faculty of Agriculture in the Awards section of the Calendar.

All inquiries should be directed to the Dean of the Faculty of Agriculture or the head of the Department of Food Science.

## 33.3 / *Pre-Veterinary Medicine Program*

### 33.3.1 / GENERAL INFORMATION

A College of Veterinary Medicine has been established at the University of Saskatchewan, Saskatoon. Its program consists of two years of pre-Veterinary Medicine and four years of Veterinary Medicine. Alberta residents desiring to take Veterinary Medicine at the University of Saskatchewan may take the two pre-Veterinary years at The University of Alberta. There is a quota on Alberta students entering Veterinary Medicine at the University of Saskatchewan and students with the highest standing in the work of the two pre-Veterinary years will receive preference.

Facilities at the Ontario Veterinary College are very limited, and because of the great current interest in veterinary medicine, few students from Alberta are likely to be admitted to that institution, with or without advanced standing. In fact all students considering Veterinary Medicine should know that there is such keen competition for admission to schools of Veterinary Medicine that a superior academic record is likely to be a requirement to win one of the limited number of places available anywhere.

Students planning to enter pre-Veterinary Medicine should note the entrance requirements described in § 32.1.5 above. Inquiries about the program should be addressed to the Dean, Faculty of Agriculture, The University of Alberta.

### 33.3.2 / PROGRAM OF COURSES

*First Year*

(1) Agriculture 202 (First Term) and Agriculture 203 (Second Term)
(2) Biology 130 or 230
(3) Chemistry 230
(4) English 210
(5) Mathematics 240 (First Term) and Statistics 241 (Second Term)
(6) Physics 100 or an elective
(7) Physical Education

*Second Year*

(1) Biology 230 or Zoology 320
(2) Chemistry 350
(3) Economics 200
(4) Genetics 351
(5) Physics 200

### 33.3.3 / TRANSFER TO PROGRAM IN AGRICULTURE

Students successfully completing the two years of pre-Veterinary Medicine may apply to transfer to the program in Agriculture and may earn the B.Sc. in Agriculture by completing two additional years of work with satisfactory standing.

## 33.4 / *Graduate Studies*

Programs leading to advanced degrees (M.Sc. and Ph.D.) are offered by all departments of the Faculty. Course programs and thesis projects are arranged in consultation with faculty members.

General information on graduate study at The University of Alberta and details respecting admission, fees, and so forth, are given in the Graduate Studies section of the Calendar. Specific information on the requirements and opportunities in a particular field of study may be obtained from the appropriate department of the Faculty of Agriculture.

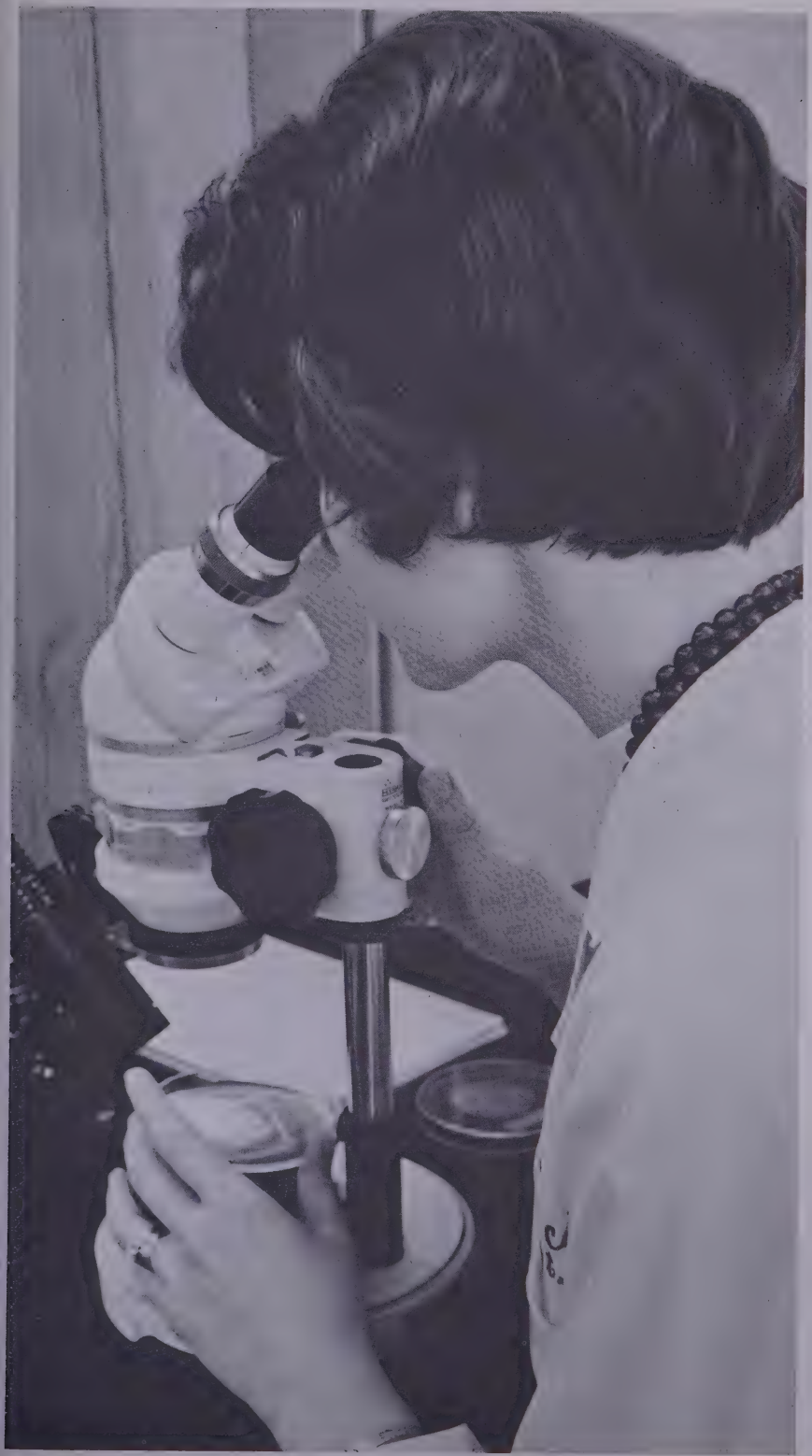
# 34 / DETAILS OF COURSES

## 34.1 / *General Information*

Courses open to students in the Faculty of Agriculture are listed here in alphabetical order, whether they are offered by the Faculty of Agriculture or by another faculty or school.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Courses numbered 100 to 199 are introductory, usually equivalent to high school courses. Those numbered 200 to 299 are junior courses, normally taken by first-year undergraduates. Those numbered 300 to 499



*Although it remains a profession dominated by men, many women, like this soil science student, are discovering interesting careers in agronomy.*

are senior courses, normally taken after the first year. Courses numbered 500 and up are normally restricted to honors and graduate students.

Following the title of the course is the symbol "♦" standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages. An ordinary full-year course is weighted 6. A half-course is normally weighted 3. Some honors and graduate courses involving research may vary in weight according to the length and difficulty of the research project. Some courses are offered for credit only, and carry no weight.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours, respectively, required by the course in a week. Where they appear, the symbol "s" denotes seminar hours and the symbol "L" denotes combined lecture-laboratory hours. The expression "3/2" means three hours of instruction every second week. The hours of instruction for a full course are the same in both terms unless otherwise indicated. If the course is a half-course, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 34.2 / *Agricultural Economics*

AG EC 367. *Economics of Agriculture.* ♦3 (First Term, 3-0). See INTER D 367.

AG EC 368. *Economics of World Agriculture.* ♦3 (Second Term, 3-0). See INTER D 368.

AG EG 369. *Elements of Farm Management.* ♦3 (First Term, 3-3). Application of economic principles to organization and management of a farm; budgeting, size of business, choice of enterprise, timing of production, farm labor utilization, farm accounting, leases and farm credit. Prerequisite: Economics 200.

AG EC 381. *Retails Marketing of Agricultural Products.* ♦3 (either term, 3-0). Wholesale and retail food market structures and conduct, with emphasis on consumer motivation, retail pricing strategies, and operational techniques and problems. Prerequsite: Economics 200 or consent of the Department.

AG EC 384. *Agricultural Marketing.* ♦3 (First Term, 3-0). Organization, institutions, and functions of agricultural markets; marketing processes for specific commodities. Occasional field trips may be arranged. Prerequisite: Economics 200 and third or fourth year standing; Agricultural Economics 367 recommended.

AG EC 385. *Agricultural Prices.* ♦3 (Second Term, 3-0). Price determination, market price discovery, future prices, and price behavior over time; exercises in statistical price analysis. Prerequisite: Agricultural Economics 384 or 367.

AG EC 400. *Special Topics.* Maximum ♦3. Study of a selected topic or problem requiring both written and oral reports. Prerequisite: Consent of the Department.

AG EC 416. *Statistical Analysis.* ♦3 (either term, 3-0). Sources of economic data relating to agricultural production, processing and marketing; collection of data, sampling methods; analysis of data, tests of hypotheses, analysis of variance, regression, and correlation; time series analysis; presentation of data. Prerequisite: Statistics 241 or 341.

AG EC 422. *Managerial Economics for Agricultural Business.* ♦3 (First Term, 3-0). Management in farm supply, service, and distribution businesses; economics of managerial decisions. Prerequisite: Agricultural Economics 367, Economics 300 or 301.

AG EC 423. *Management Techniques in Agriculture.* ♦3 (Second Term, 3-0). Application of decision-making techniques to the management of agricultural business. Prerequisite: Agricultural Economics 422.

AG EC 433. *Agricultural Production Economics.* ♦3 (either term, 3-0). Production theory and principles applied to use of land, labor, and capital; static and dynamic firm theory; farm size; resource and product combinations; production location; timing of production; cost structure; uncertainty and expectations. Prerequisite: Agricultural Economics 369.

AG EC 443. *Agricultural Finance.* ♦3 (First Term, 3-0). Capital requirements in agriculture; principles of financial management; the farm credit market; credit institutions. Prerequisite: Agricultural Economics 362 or 367.

AG EC 453. *Land Economics.* ♦3 (Second Term, 3-0). Principles of land use, population pressures, resource conservation, theory of rent, farm tenure and appraisal. Prerequisite: Agricultural Economics 362 or 367; Economics 300 or 301.

AG EC 463. *Agricultural Marketing Economics.* ♦3 (Second Term, 3-0). Economic aspects of agricultural markets; location of market activity; market structure and performance. Prerequisites: Agricultural Economics 384, Economics 300 or 301.

AG EC 473. *Agricultural Policy.* ♦3 (First Term, 3-0). Economic policy aspects of the production, marketing, and income problems of farmers. Prerequisite: Agricultural Economics 367, Economics 300 or 301.

AG EC 493. *Agricultural Growth and Adjustment.* ♦3 (Second Term, 3-0). Achieving optimum use of resources in agriculture under conditions of economic growth and technological change. Prerequisite: Agricultural Economics 367, Economics 300 or 301.

AG EC 500. *Research Projects in Agricultural Economics.* Maximum ♦3. Investigation of special problems.

AG EC 515. *Agricultural Econometrics.* ♦6 (3-0). Prerequisite: Consent of the Department.

AG EC 535. *Production Economics.* ♦6 (3-0). Prerequisite: Consent of the Department.

AG EC 553. *Economics of Land Use and Conservation.* ♦3 (either term, 3-0). Prerequisite: Consent of the Department.

AG EC 565. *Market Structure and Performance.* ♦6 (3-0). Prerequisite: Consent of the Department.

AG EC 583. *Price Analysis and Forecasting.* ♦3 (either term, 3-2). Prerequisite: Consent of the Department.

AG EC 601. *Agricultural Economics Seminar.* ♦1 (1s-0).

AG EC 613. *Research Methods.* ♦3 (either term, (3-0). Prerequisite: Consent of the Department.
AG EC 635. *Seminar in Production Economics.* ♦6 (3s-0). Prerequisite: Consent of the Department.
AG EC 655. *Seminar in Resource Economics.* ♦6 (3s-0). Prerequisite: Consent of the Department.
AG EC 665. *Seminar in Marketing Economics.* ♦6 (3s-0). Prerequisite: Consent of the Department.

## 34.3 / *Agricultural Engineering*

AG EN 200. *An Introduction to Agricultural Mechanization.* ♦3 (First Term, 3-0). Sources of energy and methods of energy conversion. The requirements of agricultural machines and structures in relation to agricultural production and labor resources.
AG EN 301. *Heating, Ventilating and Air Conditioning Agricultural Buildings.* ♦3 (3-3). Environmental requirements as determined by physiological principles. Environmental control.
AG EN 302. *Farm Structures.* ♦3 (Second Term, Term, 3-3). Structural design of agricultural buildings.
AG EN 303. *Agricultural Power Units.* ♦3 (First Term, 3-3). Engineering principles as related to the selection of power units.
AG EN 304. *Harvesting of Agricultural Crops.* ♦3 (Second Term, 3-3). Shear, impact, and particle dynamics in harvesting processes; mechanics of sieving, raking, and cutting; capacities; harvesting systems and innovations.
AG EN 305. *Agricultural Materials Handling and Processing.* ♦3 (First Term, 3-3). Characteristics of fluid, free-flow and non-free-flow materials, as related to storage, flow, elevation and transport. Principles of drying and refrigeration.
AG EN 340. *Work Study.* ♦3 (Second Term, 3-3). Application of time and motion techniques to the operation of agricultural equipment. Layout analysis. Critical path scheduling.
AG EN 342. *Work Study.* ♦3 (either term, 3-0). Time and motion techniques with critical path scheduling. Note: Not offered to students from the Faculty of Agriculture.
AG EN 401. *Quantitative Methods in Agricultural Mechanization.* ♦6 (3-3). Application of quantitative methods to the solution of actual problems involving materials handling, equipment selection, and production layout. The use of analog and digital computers in agricultural problem solving, control, and simulation.
AG EN 402. *Agricultural Buildings.* ♦3 (either term, 3-0). Studies on special problems or topics related to buildings. Prerequisite: Agricultural Engineering 301 and 302 or consent of the Department.
AG EN 405. *Traction and Tillage.* ♦3 (First Term, 3-3). Shear strength, pressure, and bearing capacity of soils, properties of soil cohesion and friction, simple traction and tillage theories, mechanics of tractor and implement chassis, mounting and hitching of implements, tractor and implement hydraulics, tractor test code. Prerequisite: Agricultural Engineering 200 or consent of the Department.
AG EN 406. *Agricultural Materials Handling.* ♦3 (Second Term, 3-3). Metering and conveying fluid, free-flow, and non-free-flow agricultural materials. Size reduction.
AG EN 407. *Advanced Agricultural Work Study.* ♦3 (First Term, 3-3). Agricultural applications of critical path scheduling to work study standard data; production control and maintenance techniques in relation to large agricultural processing units.
AG EN 600. *Agricultural Engineering Seminar.* ♦1 (1s-0).
AG EN 601. *Operations Research.* ♦6 (3-3). Application of statistical and mathematical techniques to selected problems in Agricultural Mechanization.

## 34.4 / *Agriculture*

AGRIC 202. *Introduction to Professional Agriculture.* ♦0 (Second Term, 2-0).
AGRIC 203. *Public Speaking.* ♦0 (First Term, 2-0).
AGRIC 451. *Practical and Professional Agriculture.* ♦0 (1-0).

## 34.5 / *Animal Science*

AN SC 300. *Principles of Animal Physiology.* ♦3 (First Term, 3-3). An introduction to the fundamental principles which initiate and regulate animal functions. Laboratory exercises in physiological techniques. Prerequisites or corequisites: Chemistry 350, Biology 230, or consent of the Department.
AN SC 310. *Applied Physiology of Domestic Animals.* ♦3 (Second Term, 3-3). Physiological mechanisms of digestion, metabolism, growth, reproduction, and lactation in farm animals. Prequisite: Animal Science 300, or permission of the Department.
AN SC 370. *Livestock Production and Management.* ♦3 (First Term, 3-3).
AN SC 468. *Fundamentals of Nutrition.* ♦3 (First Term, 3-3). Prerequisite: Chemistry 350.
AN SC 469. *Applied Animal Nutrition.* ♦3 (Second Term, 3-3). Prerequisite: Animal Science 468, or permission of the Department.
AN SC 470. *Project Course.* ♦ varies from 2 to 4 depending on the project. A written report on a selected problem. Open only to fourth-year students with at least 6.0 average.
AN SC 484. *Animal Population Genetics.* ♦3 (First Term, 3-0). Prerequisite: Genetics 360 or equivalent.
AN SC 485. *Animal Improvement.* ♦3 (Second Term, 3-3). Prerequisite: Animal Science 484.
AN SC 491. *Animal Biochemistry.* ♦3 (Second Term, 3-3). Prerequisite or corequisite: Biochemistry 300 or equivalent, or permission of the Department.
AN SC 501. *Research Project.* ♦varies from 2 to 6 depending on the project.
AN SC 512. *Advanced Nutrition.* ♦6 (3-0). Classical studies, experimental techniques, and recent advances.
AN SC 580. *Biometrical Techniques in Animal Improvement.* ♦3 (First Term, 2-3). Prerequisite: Animal Science 485 or Poultry Science 453. Corequisite: Biometrics 455.
AN SC 600. *Seminar.* ♦1 (0-1s). Required of all graduate students.
AN SC 680. *Research Techniques in Quantitative Animal Genetics.* ♦3 (Second Term, 2-4). Prerequisite: Animal Science 580. Corequisite: Computing Science 456.

## 34.6 / *Biochemistry*

Department of Biochemistry, Faculty of Medicine

BIOCH 300. *General Biochemistry.* ♦6 (3-3). Structure and chemistry of the cell; the chemistry and metabolism of carbohydrates, lipids, proteins and nucleic acids; the molecular biology of enzymes and genes as related to the functioning of the living cell. Prerequisites: Chemistry 230 and 250.

BIOCH 372. *Topics in Biochemistry.* ♦6 (3-1s-3). The topics of Biochemistry 300 discussed in a more rigorous manner. Seminars on current research in Biochemistry and Molecular Biology. Prerequisites: Chemistry 230 and 250. Chemistry 370 or 372 and Mathematics 201 desirable as prerequisites or corequisites. Note: Designed for graduate students, honors students, and selected students from all departments.

## 34.7 / *Biology*

Departments of Botany, Entomology, Genetics, Microbiology and Zoology

BIOL 130. *Introductory Biology.* ♦6 (3-3). Note: Not open to students with credit in Biology 30.

BIOL 230. *Intermediate Biology.* ♦6 (3-3). Note: Designed for students with high school Biology 30. Prerequisite: Biology 30 or Biology 130.

BIOL 445. *Cell Physiology.* ♦3 (Second Term, 3-3). Current advances in cell biology. The integration of biochemical and structural changes with cell function. Prerequisites or corequisites: Biochemistry 300 or Plant Physiology and Biochemistry 431 and 432 or consent of the Department.

## 34.8 / *Biometrics*

Departments of Genetics and Plant Science

BIOM 455. *Statistics for Biological Research.* ♦6 (3-3).

BIOM 605. *Design of Experiments.* ♦3 (either term, 2-3). Prerequisite: Biometrics 455, Mathematics 450, or permission of the instructor.

## 34.9 / *Botany*

BOT 300. *Flowering Plants.* ♦6 (3-3). The origin and evolution of flowering plants; their morphology and classification; species concepts; plants in relation to their environment, principles of nomenclature. Prerequisite: Biology 230 or consent of the Department.

BOT 310. *Plant Anatomy and Histology.* ♦6 (3-3). The structure and development of organs and tissues of the higher plants. Emphasis on the experimental approach to anatomical studies and on the environmental and physiological control of development and morphology. Prerequisite: Biology 230 or consent of the Department.

BOT 320. *Introductory Plant Physiology.* ♦6 (3-3). A general course in plant physiology including: recent advances in water relations, permeability, active uptake of salts, enzymes, respiration, photosynthesis, intermediary metabolism, nitrogen assimilation and translocation. Prerequisites or corequisites: Biology 230, Chemistry 230, Chemistry 250 or 350, or consent of the Department.

BOT 341. *Mycology.* ♦3 (First Term, 3-3). A systematic survey of the fungi with detailed study of representatives of major groups. Emphasis on classification, life cycles, and distribution. Prerequisite: Biology 230 or consent of the Department.

BOT 342. *Physiology of Fungi.* ♦3 (Second Term, 3-3). Factors affecting growth and reproduction of fungi; beneficial and harmful activities of fungi. Prerequisite: Biology 230 and Botany 341 or consent of the Department.

## 34.10 / *Chemistry*

CHEM 230. *Inorganic Chemistry.* ♦6 (3-1s-3). The fundamental concepts of Chemistry as applied to the elements and their compounds. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

CHEM 250. *Organic Chemistry.* ♦6 (3-1s-3). Introduction to a study of the compounds of carbon. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent. Notes: Students with credit in Chemistry 230 normally will proceed to Chemistry 350, not 250. Students not concurrently taking Chemistry 230 are required to take the one-hour seminar.

CHEM 350. *Organic Chemistry.* ♦6 (3-3). An introduction to a study of the compounds of carbon. Prerequisite: Chemistry 230 or 232. Note: Students who have obtained credit for Chemistry 250 cannot take Chemistry 350 for credit.

CHEM 370. *Elementary Physical Chemistry.* ♦6 (3-3). The laws of thermodynamics; states of matter; solutions; equilibrium; phase rule; electrochemistry; colloids; kinetics of reaction. Prerequisite: Chemistry 230 or 232.

## 34.11 / *Civil Engineering*

CIV E 338. *Principles of Irrigation and Drainage.* ♦4 (2-0). Elementary problems of hydraulics and drainage as applied to the layout of irrigation systems. Waterlogging and alkali formation.

## 34.12 / *Computing Science*

CMPUT 310. *Elements of Programming.* ♦6 (3-0). Structure of computers; instructions, algorithms and programs; languages of computer programming; conventional computers; assemblers and compilers.

CMPUT 440. *Linear Programming and Matrix Algebra.* ♦3 (Second Term, 3-0). Prerequisites: Mathematics 30, and an introductory course in Computing Science: Note: Not open to students with credit in Mathematics 243.

CMPUT 450. *Digital and Analog Computers with Applications in Chemistry.* ♦3 (Second Term, (3-3/2).

CMPUT 459. *Introduction to Scientific Programming.* ♦3 (First Term, 3-0). Prerequisites: Open to fourth-year and graduate students with at least one university course in Mathematics or Statistics. Not open to students with credit in any introductory course in Computing Science.

## 34.13 / *Economics*

ECON 200. *Principles of Economics.* ♦6 (3-0). A survey of various aspects of economics; the nature of economic problems and systems; the functions of money; commercial and central banking; national income analysis; monetary and fiscal policy; pricing under competitive and monopolistic conditions; selected topics in analysis and policy. Prerequisite: Mathematics 30 or 100.

ECON 300. *Micro-Economic Analysis.* ♦6 (3-0). The theory of consumer behavior; price and output determination under competition, monopoly and other market structures; allocation of resources and resource pricing; distribution of income. Prerequisite: Economics 200. Note: Not to be taken by students who have credit in Economics 301.

ECON 367. *Economics of Agriculture.* See INTER D 367.

ECON 368. *Economics of World Agriculture.* See INTER D 368.

ECON 560. *Agriculture in Developing Countries.* ♦6 (3-0).

## 34.14 / *English*

ENGL 210. *English Language and Literature.* ♦6 (3-0). Designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

## 34.15 / *Entomology*

ENT 200. *Introduction to General and Agricultural Entomology.* ♦3 (Second Term, 3-3). Structure and life cycles of insects and related Arthropods. Introduction to classification and to ecology. Agricultural importance. Prerequisite: Biology 30 or 130 or equivalent.

ENT 302. *Survey of Entomology.* ♦3 (First Term, 3-3). Lives of insects and related Arthropods from a functional viewpoint. Ecology and applied entomology. Prerequisites: Biology 30 or 130 and Zoology 350 or Entomology 200.

ENT 317. *Insect Morphology.* ♦3 (First Term, 3-0). Structure and function of insects from the comparative and functional viewpoints. Textbooks: Snodgrass, *Principles of Insect Morphology;* Matsuda, *Morphology and Evolution of the Insect Head.* Prerequisites: Entomology 200, 201, or 302. Corequisite: Entomology 318.

ENT 318. *Laboratory in Morphology.* ♦6 (6L). Practical work related to Entomology 317. Corequisite: Entomology 317.

ENT 471. *Project in Applied Entomology.* A survey of the literature on one or more topics in applied entomology with or without an experimental study of a related simple problem. Weight according to work done to a maximum of ♦6.

ENT 476. *Insect Toxicology.* ♦6 (2-4). Selective toxicity principles. Chemistry, mode of action, and metabolism of insecticides and repellents. Textbook: O'Brien, *Insecticides, Action and Metabolism.* Prerequisite: Chemistry 230 and 250 or 350, Entomology 200 or 302 desirable.

ENT 527. *Insect Taxonomy.* ♦3 (First Term, 3-0). Principles and procedures. Classification of insects. Zoological nomenclature. Speciation, phylogeny and zoogeography. Prerequisite: Entomology 317 desirable. Corequisite: Entomology 528 or consent of instructor.

ENT 528. *Insect Taxonomy.* ♦6 (0-6). A laboratory study related to Entomology 527. Prerequisite or corequisite: Entomology 527.

ENT 556. *Insect Physiology.* ♦6 (2-5). Life processes illustrated by insects with emphasis on those peculiar to them and their relatives. Prerequisite: Entomology 317 or consent of the Department.

ENT 560. *Insect Ecology.* ♦6 (2-5). Relationships of insects to their environment. Community interactions. Prerequisite: Entomology 201 or 200 and 471.

ENT 610. *Advanced Morphology and Histology.* Continuing from Entomology 314 including a detailed study of internal structure. Weight according to work done to a maximum of ♦6. Prerequisite: Entomology 317.

ENT 621. *Advanced Taxonomy.* Classification and biology of, and literature on, one or more of the major orders. Weight according to work done to a maximum of ♦6. Prerequisite: Entomology 522.

ENT 650. *Project in Insect Physiology.* A review and interpretation of literature on a selected topic with an experimental study of a related problem. Weight according to work done to a maximum of ♦6. Prerequisite: Entomology 556.

## 34.16 / *Field Crops*

Department of Genetics

F CR 354. *Forage Crops.* ♦3 (Second Term, 3-3). Characteristics of forage crops, management and conservation; laboratory exercises.

F CR 355. *Cereals, and Industrial Field Crops.* ♦3 (First Term, 3-3).

## 34.17 / *Food Science*

### 34.17.1 / FOOD SCIENCE

FD SC 200. *Introduction to Food Science.* ♦3, no weight for Food Science majors (First Term, 3-0). Historical and philosophical aspects of food processing and its relation to man's health and well-being. World's food supply and its use by human populations. Trends in the processing, preservation, handling, and utilization of food.

FD SC 241. *Principles of Milk Production.* ♦3 (Second Term, 3-3). Milk secretion. Mechanics and operation of machine milking. Mastitis and milking procedure. Systems of milking. Cleaning and sterilization of dairy equipment. Composition and constituents of milk.

FD SC 490. *Reading Project.* Maximum yearly credit one full course. (Either or both terms for third and fourth year students only.)

FD SC 650. *Seminar.* ♦1 (either term, 1s-0). Reports and discussion of research problems. Required during each year of all graduate students.

### 34.17.2 / FOOD PROCESSING AND ENGINEERING

FD SC 250. *Elements of Food Processing.* ♦3 (First Term, 3-3). An introduction to the scientific and technical principles involved in unit operations and processes applied in the commercial manufacture of food products.

FD SC 353. *Processing Dairy Products.* ♦3 (Second Term, 3-3). Prerequisite: Food Science 250 or permission of the Department.

FD SC 451. *Industrial Food Processing.* ♦3 (First Term, 3-3). Unit operations involved in the preservation of fruits and vegetables will be emphasized. Also standards for grading and packaging.

FD SC 452. *Industrial Food Processing.* ♦3 (Second Term, 3-3). Food processing and preservation methods. New product development and marketing. Pilot plant operation and field trips. Prerequisite: Food Science 451 or permission of the Department.

FD SC 480. *Principles of Food Engineering I.* ♦3 (First Term, 3-3). The fundamentals of fluid flow and heat transfer applied to food processing operations. Thermal processing evaluation will be studied in depth. Prerequisite: Chemical Engineering 224 or equivalent.

FD SC 481. *Principles of Food Engineering II.* ♦3 (Second Term, 3-3). Includes instrumentation and controls, storage, waste utilization and disposal, plant layout and design. Prerequisite: Food Science 480.

## 34.17.3 / FOOD AND INDUSTRIAL MICROBIOLOGY

FD SC 465. *Food Microbiology.* ♦3 (First Term, 3-3). The microbiology of the food, beverage, and allied industries. Prerequisite: Microbiology 360 or permission of the Department.

FD SC 466. *Dairy Microbiology.* ♦3 (Second Term, 3-3). The microbiology of the production of milk and other dairy products. Prerequisite: Microbiology 360 or permission of the Department.

FD SC 560. *Industrial Microbiology.* ♦3 (First Term, 1L-4). Advanced techniques including use of small scale fermenters. Prerequisite: Food Science 465 or 466 or permission of the Department.

FD SC 561. *Advanced Food Microbiology.* ♦3 (Second Term, 1L-4). Prerequisite: Food Science 465 or 466 or permission of the Department.

FD SC 562. *Industrial Microbiology.* ♦3 (First Term, 3-0). Prerequisites: Plant Physiology and Biochemistry 431 and 432 (or Biochemistry 300) and Microbiology 360 or Food Science 465 or 466 or permission of the Department.

FD SC 563. *Industrial Microbiology.* ♦3 (Second Term, 3-0). A continuation of Food Science 562. Prerequisites: Plant Physiology and Biochemistry 431 or 432 (or Biochemistry 300) and Microbiology 360 or Food Science 465 or 466 or permission of the Department.

FD SC 660. *Advanced Applied Microbiology.* ♦3 (either term, 3-0). A lecture and discussion course on topics of current interest in applied microbiology with reading of original literature.

## 34.17.4 / FOOD CHEMISTRY

FD SC 474. *Food Analysis and Quality Control.* ♦3 (First Term, 3-3). Prerequisites: Chemistry 230 and Plant Biochemistry and Physiology 431 and 432 or Biochemistry 300 or permission of the Department.

FD SC 475. *Food Chemistry.* ♦3 (Second Term, 3-3). Prerequisites: Plant Biochemistry and Physiology 431 and 432, or Biochemistry 300 or permission of the Department.

FD SC 476. *Dairy Chemistry.* ♦3 (First Term, 3-3). Prerequisites: Plant Biochemistry and Physiology 431 and 432, or Biochemistry 300 or permission of the Department.

FD SC 571. *Food Rheology.* ♦2 (First Term, 1-2). Flow and deformation of foods and food constituents. Relation between flow properties and structure. Methods for measurement of rheological properties of foods. Note: Not available every year.

FD SC 572. *Sensory Analysis of Foods.* ♦2 (Second Term, 1-2). Physiology, psychology and biochemistry of taste and olfaction. Factors influencing sensory measurements. Taste panel tests and procedures. Qualitative and quantitative evaluation. Statistical procedures. Consumer acceptance studies. Note: Not available every year. Textbook: Amerine, Pangborn and Roessler, *Principles of sensory evaluation of foods.*

FD SC 671. *Advanced Food Chemistry.* ♦3 (Second Term, 3-3). Prerequisites: Plant Biochemistry and Physiology 431 and 432, or Biochemistry 300 or permission of the Department.

FD SC 672. *Chemistry of Fats and Oils.* ♦2 (Second Term, 1-3). Prerequisites: Plant Biochemistry and Physiology 431 and 432, or Biochemistry 300, and Food Science 475.

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## 34.18 / *French*

Department of Romance Languages, Faculty of Arts.

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FREN 100. *Beginners' French.* ♦6 (5-0). Designed to enable students entering with complete matriculation but without French to begin their study of this language in the University. Note: Normally, students will go from French 100 to French 200.

FREN 200. *First Year University French.* ♦6 (3-1). Intensive training in spoken and written French, including grammar, composition and literature.

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## 34.19 / *Genetics*

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GENET 351. *Principles of Genetics.* ♦6 (3-3). Prerequisite: Biology 30 or 130.

GENET 352. *Principles of Genetics.* ♦6 (3-0). Prerequisite: Biology 30 or 130. Content the same as Genetics 351, without laboratory exercises.

GENET 360. *Basic Concepts in Genetics.* ♦3 (Second Term, 3-3). Prerequisite: Biology 30 or 130.

GENET 420. *Genetics of Bacteria and Viruses.* ♦3 (First Term, 3-0). Basic genetic mechanisms in bacteria and the bacteriophages. Prerequisite: Genetics 351, or consent of the Department. (Not offered, 1968-69.)

GENET 430. *Fungal Genetics.* ♦3 (First Term, 3-0). Prerequisite: Genetics 351 or equivalent, or consent of the Department.

GENET 445. *Biochemical Genetics.* ♦3 (Second Term, 3-0). Molecular mechanisms of gene expression and regulation. Prerequisite: Genetics 351 or consent of the Department. Genetics 420 is recommended.

GENET 463. *Principles of Plant Breeding.* ♦3 (Second Term, 3-0). Prerequisite: Genetics 351 or 360.

GENET 481. *Population Genetics.* ♦3 (First Term, 3-0). Prerequisite: Genetics 351 or equivalent. (Not offered, 1968-69.)

GENET 483. *Evolutionary Genetics.* ♦3 (Second Term, 3-0). Prerequisite: Genetics 481. (Not offered, 1968-69.)

GENET 505. *Reading or Research Project.* ♦3 or 6.

GENET 511. *Cytology.* ♦3 (First Term, 3-3). Prerequisite: Chemistry 250 or equivalent, and Genetics 351 or equivalent.

GENET 515. *Cytogenetics.* ♦3 (Second Term, 3-3). Prerequisite: Genetics 351 or equivalent.

GENET 517. *Mathematical Foundations of Genetic Analyses.* ♦3 (Second Term, 3-3). Prerequisite: Genetics 351 or equivalent and Mathematics 242.

GENET 520. *Quantitative Genetics.* ♦3 (Second Term, 3-0). Prerequisite: Genetics 351 or equivalent. (Not offered, 1968-69.)

GENET 552. *Radiation Genetics.* ♦3 (Second Term, 3-0). Prerequisite: Genetics 351 or consent of the Department.

GENET 586. *Developmental Genetics.* ♦3 (First Term, 3-0). Prerequisite: Genetics 351 or equivalent, or consent of the Department. (Not offered, 1968-69.)

GENET 601. *Advanced Genetics.* A seminar course on advanced and current topics in Genetics.

## 34.20 / *Geography*

GEOG 302. *Economic Geography.* ♦6 (3-0). Analysis of the locational characteristics of economic activities throughout the world. Renewable and non-renewable resources and raw materials, agricultural, extractive, manufacturing and service industries reviewed systematically and in place. The significance of location and spatial arrangement with respect to the relationships between geography and economics.

GEOG 303. *Weather and Climate.* ♦6 (3-3). A survey of weather processes and phenomena, regional weather patterns, climatic classification, and climates of the continents, with some consideration of climatic change. First term work will concentrate on weather elements and physical weather processes: temperature, wind, cloud forms, circulation patterns, storms, etc. The second term will be devoted to climatology. Laboratory assignments: analysis of simple weather maps, studies of local and regional weather patterns, and interpretation of climatic data. Note: A student cannot receive credit for both Geography 303 and Meteorology 307.

GEOG 403. *Microclimatology.* ♦3 (Second Term, 3L). The climate of the lowest layers of the atmosphere. The relation of microclimatology to topography, plant and animal habitat, and man.

GEOG 418. *Geography of Water Resources.* ♦6 (3L). Local, regional and world patterns of water supply and demand. Precipitation, evapotranspiration, streamflow, soil moisture, ground water and the management of watershed regions. Domestic, municipal, industrial, irrigation, hydropower, navigational, fishing, recreational and other demands and the problems of supply, modification and allocation. Prerequisite: Geography 201 or consent of the Department.

GEOG 456. *Agricultural Geography.* ♦6 (3-0). The development of regional patterns of agricultural production. Prerequisite: Geography 201, or consent of the Department.

## 34.21 / *Geology*

GEOL 201. *General Geology.* ♦6 (3-3). An introduction to the study of the Earth's nature, history and origin, of the various processes which operate on and below its surface, and of the plants and animals which have lived on its surface, with emphasis on the following topics: composition, structure and state of the Earth; minerals and rocks; ground water and water supply; weathering and soils; erosion; deposition; igneous activity; mountain building; geologic history; fossils.

GEOL 202. *Physical Geology.* ♦3 (First Term 3-3). An introduction to the study of the earth emphasizing the following topics; composition, structure and state of the Earth; minerals and rocks; groundwater and water supply; weathering and soils; erosion; deposition; igneous activity; mountain building.

GEOL 302. *Geology and Mineral Deposits of Canada.* ♦6 (3-0). The geologic regions of Canada; their stratigraphy, structure and mineral deposits. Extensive use of maps, sections, suites of demonstration minerals and rocks, and assigned readings. Prerequisite: Geology 201 or 301. Note: Designed for students not majoring in Geology.

GEOL 465. *Geomorphology.* ♦3 (First Term 3-3). Land forms and the processes which create and modify them; weathering, mass-wasting, stream erosion, wave erosion, wind erosion, and glaciation; study of land forms on aerial photographs and topographic maps; field trips. Prerequisite: Geology 201 or consent of the Department.

GEOL 466. *Glacial Geology.* ♦3 (Second Term 3-3). Elements of glaciology; description of glacial deposits and landforms; periglacial phenomena; outline of glacial stratigraphy of North America; interpretation of glacial features from topographic maps and aerial photographs; examination of glacial sediments; field trips. Prerequisite: Geology 201 or consent of the Department.

GEOL 470. *Hydrogeology.* ♦3 (3L). The occurrence, distribution, movement and chemistry of groundwater as a function of the geological environment; groundwater as a geologic agent; methods of collection, organization and use of hydrogeologic data; groundwater budgets, model studies, selected problems and case histories. Prerequisite: Geology 201 and consent of the Department.

## 34.22 / *German*

GERM 210. *Scientific German.* ♦6 (3-0). An intensive course to give beginning students a reading knowledge of scientific German. Note: Not open to general program students. Especially designed to meet the needs of honors students from science departments, and of students in the professional faculties desiring a knowledge of scientific German.

## 34.23 / *Horticulture*

Department of Plant Science

HORT 341. *General Horticulture.* ♦3 (Second Term, 3-3). Elementary course designed for those students who do not wish specialized instruction in the various phases of horticulture. A survey of horticulture, with an introduction to the theories of nutrition, modification of environment and utilization of horticultural plants. Laboratory work in propagating, cultural, and marketing procedures.

HORT 350. *Principals of Horticulture.* ♦ (First Term, 3-3). A basic course in horticulture, with special emphasis on the physiology of horticultural crops. Laboratory practice in plant identification, propagation, culture, marketing, and storage of crops; their economic importance and value as foods. Prerequisite: Biology 130 or equivalent.

HORT 360. *Systematic Horticulture.* ♦3 (First Term, 2-3). Classification, nomenclature, adaptation and morphology of horticultural plants. Prerequisite or corequisite: Horticulture 352.

HORT 454. *Fruit Crops.* ♦3 (Second Term, 3-3). Prerequisite: Horticulture 352 or consent of instructor.

HORT 455. *Vegetable Crops.* ♦3 (Second Term, 3-3). Prerequisite: Horticulture 352 or consent of instructor.

HORT 457. *Greenhouse Crops.* ♦3 (Second Term, 3-3). Prerequisite: Horticulture 352 or consent of instructor.

HORT 458. *Ornamental Crops.* ♦3 (First Term, 3-3). Herbaceous and woody ornamentals, turfs. Prerequisite: Horticulture 352 or consent of instructor.

HORT 460. *Landscape Architecture.* ♦3 (First Term, 3-3). Elements and principles of design; and application to problems in landscape design.

HORT 461. *Advanced Landscape Architecture.* ♦3 (Second Term, 0-6). Emphasis on the analytical approach to design problems in recreation, residential and public housing areas, schools and shopping centres. Prerequisite: Horticulture 460.

HORT 507. *Reading Projects in Horticulture.* ♦up to 6, depending on the project. Library study and regular meetings for discussion.

HORT 508. *Research Projects.* ♦up to 6, depending on the project.

HORT 509. *Selected Topics in Horticulture.* ♦up to 6, depending on the project. Recent developments of special interest discussed at an advanced level.

## 34.24 / *Interdepartmental Courses*

Courses listed hereunder are the concern of more than one discipline. Students may register in these courses either as options or as courses in subjects of concentration in one of the disciplines listed in the footnote under each course, subject to the usual curriculum requirements, prerequisites, etc.

Instruction will be offered by members of one or more of the departments listed beneath the course description.

INTER D 356. *Sociology of Rural Life.* ♦3 (either term, 3-0). The rural community and rural social systems, with special reference to changes in the rural way of life. Prerequisite: Sociology 202 or 403 or consent of the Department. Note: Formerly SOC/RURAL SOC 356.

INTER D 367. *Economics of Agriculture.* ♦3 (First Term, 3-0). The nature and scope of agricultural economics; economic aspects of agricultural production, marketing, finance, resource use, prices, and policy; relation of the agricultural sector to the economy as a whole; analysis of structural change, economic growth and adjustment in agriculture. Prerequisite: Economics 200. Note: Formerly AG EC/ECON 367.

INTER D 368. *Economics of World Agriculture.* ♦3 (Second Term, 3-0). A survey of world structure of agricultural production, consumption, and trade; international agricultural policies and agreements; impact of regional economic integration on agriculture; interrelation of economic development and trade in agricultural commodities. Prerequisite: Economics 200. Note: Formerly AG EC/ECON 368.

INTER D 456. *Rural Social Problems and Public Policy.* ♦3 (First Term, 3-0). Social problems in Canadian rural life; analysis of policy making processes related to these problems. Prerequisite: Sociology 202 or 403 or consent of the Department. Note: Formerly SOC/RURAL SOC 456.

INTER D 458. *Agrarian Social Movements.* ♦3 (Second Term, 3-0). A sociological analysis of major agrarian social movements in North America. Prerequisite: Sociology 202 or 403 or consent of the Department. Note: Formerly SOC/RURAL SOC 458.

INTER D 459. *Sociology of Community Development.* ♦6 (3-0). Human communities; their institutional structure, ecological factors associated with patterns of growth, community relations, community planning and community development. Prerequisite: Sociology 202 or 403 or consent of the Department. Note: Formerly SOC/RURAL SOC 459.

## 34.25 / *Mathematics*

MATH 180. *Trigonometry and Polynomial Calculus.* ♦6 (4-0). Trigonometric functions and identities. Solution of triangles. Simple algebraic curves. Differentiation and integration of elementary functions. Applications. Prerequisite: Mathematics 30 or its equivalent.

MATH 201. *Introductory Calculus.* ♦6 (5-0). Rates of change. Differentiation and integration of simple functions. Applications. Analytic geometry of the conic sections. Exponential, logarithmetic and trigonometric functions. Prerequisite: Mathematics 30 and 31 or their equivalents. Corequisite: Some students lacking Mathematics 31 or its equivalent may take Mathematics 201 by taking Mathematics 101 concurrently. (See the conditions under which a student may take Mathematics 101.)

MATH 220. *Elementary Calculus.* ♦6 (3-0). Differentiation and integration of trigonometric functions. Polar co-ordinates. Logarithmic and exponential functions. Conic sections. Areas and volumes. Prerequisite: Mathematics 180.

MATH 240. *Algebra and Elementary Calculus.* ♦3 (either term, 3-1). Elementary algebraic operations. Graphs of polynomial functions. Exponents and logarithms. Permutations and combinations. The Binomial Theorem. Arithmetic and geometric progressions. Calculus of polynomial functions. Maxima and minima. Prerequisite: Mathematics 30 or equivalent. Note: Not available for first year Arts or Science. Designed as a prerequisite for Statistics 241.

MATH 242. *Algebra, Elementary Calculus and Probability.* ♦6 (3-1). Elementary algebraic operations. Graphs of polynomial functions. Exponents and logarithms. Permutations and combinations. The Binomial Theorem. Arithmetic and geometric progressions. Calculus of polynomial functions. Maxima and minima. Probability models. Sampling. Product models. Conditional probability. Random variables. Special distributions. Multivariate distributions. Prerequisite: Mathematics 30 or equivalent.

MATH 243. *Linear Algebra.* ♦3 (First Term, 3-0). Vector and matric operations. Linear systems of equations, dimension, axiomatic definition of vector space, constructive solution of linear equations, computation of inverses. Linear inequalities, convex sets, introduction to linear programming. Binary relations: equivalence, order, graphs. Invariants, canonical forms, eigenvalues and quadratic forms. Finite Markov chains. Prerequisite: Mathematics 30 or equivalent.

MATH 304. *Calculus and Analytical Geometry.* ♦6 (3-2). Determinants. Polar and parametric coordinates. Methods and applications of integration. Infinite series. Vectors and space geometry. Partial differentiation. Complex numbers. Multiple integrals. Elements of linear differential equations. Prerequisite: Mathematics 201 or 220, or equivalents.

MATH 340. *Calculus and Numerical Analysis.* ♦3 Second Term, 3-0). Calculus of rational, logarithmic and exponential functions. Functions of several variables. Partial derivatives and extreme values. Linear difference equations with constant coefficients. Interpolation procedures. Systems of linear equations. Numerical integration. Numerical solutions of equations. Prerequisite: Mathematics 240 or 242 or equivalent.

## 34.26 / *Microbiology*

MICRB 201. *Elementary Microbiology.* ♦3 (3-3). An introduction to the microbial world, with emphasis on general characteristics of bacterial growth and fundamentals of classification. Note: Offered to students in Agriculture and Household Economics, and as a Natural Science option to students in Arts. Not available to students in Science.

MICRB 360. *General Microbiology.* ♦6 (3-3). Properties and activities of bacteria, fungi and viruses, leading to an interpretation of the mechanisms of sterilization, pathogenicity and immunity, chemotherapy and industrial processes. Laboratory exercises in basic microbiological techniques and their practical applications. Prerequisites: Chemistry 230 and Chemistry 250 or 350, which may be taken concurrently; Biology 230 or 130.

## 34.27 / *Physical Education*

Faculty of Physical Education

PHYS ED 218. *Activity Course—Men.* ♦nil (0-2). Tests in fitness and acquatics in the First Term, followed by student-selected recreational activities. Note: Course required of all first-year men.

PHYS ED 228. *Activity Course—Women.* ♦nil (0-2). Foundations of Physical Education with emphasis on fitness, followed by two electives in recreational activities. Note: Course required of all first-year women.

## 34.28 / *Physics*

PHYS 100. *Introductory General Physics.* ♦6 (3-3). Introduction to the experimental phenomena and theoretical ideas of physics. Note: This may be taken as a substitute for Grade XII Physics, but is given from a more advanced point of view with greater reference to current developments. This course may not be taken for credit by students who already have credit for Physics 30.

PHYS 200. *Basic General Physics.* ♦6 (3-3). The mechanical, thermal, electromagnetic and optical properties of matter; the forms and transformations of energy; introduction to the atomic theories of modern physics. (For continuation, see Physics 300 and 400.) Prerequisites: Physics 30, Mathematics 30.

## 34.29 / *Plant Pathology*

Department of Plant Science

PL PA 480. *Principles of Plant Pathology.* ♦3 (First Term, 3-3). An introductory study of the nature, cause, and control of plant diseases. Prerequisite: Biology 230.

PL PA 481. *Diseases of Field Crops.* ♦3 (First Term, 3-3). Diseases of grain, forage, and other field crops. Prerequisite: Plant Pathology 480.

PL PA 482. *Diseases of Horticultural Crops.* ♦3 (Second Term, 3-3). Diseases of potato, vegetable, fruit, and ornamental plants. Prerequisite: Plant Pathology 480.

PL PA 510. *Plant Virology.* ♦3 (First Term, 3-3). Basic principles and methods dealing with morphology, purification, multiplication, mutation, and transmission of plant viruses. Prerequisite: Consent of instructor.

PL PA 511. *Reading Project Course.* ♦up to 6, depending on the project. A written report on a selected project.

PL PA 512. *Research Projects.* ♦up to 6, depending on the project.

PL PA 635. *Plant Pathogenesis.* ♦3 (First Term, 3-0). A critical review of literature related to the physiology of diseased plants, e.g., effect on growth, disintegration of tissue, wilting and changes in respiration. Prerequisite: Consent of instructor.

PL PA 636. *Plant Pathogenesis.* ♦3 (Second Term, 3-0). A continuation of Plant Pathology 635; histological, physiological and biochemical defense mechanisms, toxins, fungicidal action. Prerequisite: Consent of instructor.

## 34.30 / *Plant Physiology and Biochemistry*

Department of Plant Science

PL PH 400. *Physiology and Biochemistry of Crop Plants.* ♦3 (Second Term, 3-0). Prerequisite or corequisite: Chemistry 250 or 350.

PL PH 431. *Plant Biochemistry.* ♦3 (First Term, 3-3). An introduction to biochemistry, with consideration of the comparative aspects of the subject. Intracellular structure, acidity and colloidal properties of protoplasm, chemistry and metabolism of carbohydrates, including respiration and photosynthesis. Prerequisites: Chemistry 230 and Chemistry 250 or 350, or consent of the instructor.

PL PH 432. *Plant Biochemistry.* ♦3 (Second Term, 3-3). A continuation of Plant Biochemistry 431. Biochemistry of lipids and related constituents, the chemistry and metabolism of nitrogen-containing compounds, and metabolic control mechanisms. Prerequisite: Plant Biochemistry 431.

PL PH 477. *Cereal Chemistry.* ♦3 (Second Term, 3-3).

PL PH 513. *Reading Projects in Plant Physiology and Biochemistry.* ♦up to 6, depending upon work done.

PL PH 514. *Research Projects in Plant Physiology and Biochemistry.* ♦up to 6, depending on the project.

PL PH 551. *Advanced Plant Biochemistry.* ♦3 (Second Term, 3-0). Selected topics in plant metabolism, with emphasis on the comparative biochemistry of respiration and carbon assimilation. Evaluation of recent research and methods of

investigation of these fields. Offered alternate years. Prerequisites: Biochemistry 300 or 372 or Plant Physiology 431 and 432 or consent of the Departments.

PL PH 620. *Plant Morphogenesis.* ♦4 (2-2). Prerequisite: Consent of instructor.

## 34.31 / *Plant Science*

PL SC 356. *Range Management.* ♦3 (First Term, 3-3). Introduction to range management principles and practices: effects of grazing on plants; vegetation types; utilization and range health; range improvement; range management planning; classification and grazing characteristics of important range plants in Canada. Note: Recommended as a prerequisite or corequisite for Plant Science 357.

PL SC 357. *Vegetation Control and Applied Ecology.* ♦3 (Second Term, 3-1). Vegetation types, environmental control of plant growth and of land uses. Agronomic and chemical control methods in agriculture, forestry, wildlife management, aquatic and other aspects of resource conservation.

PL SC 500. *Seminar in Plant Science.* ♦1 (1-1). Oral reports by individual students covering the literature on selected topics. Required each year of all graduate students in Plant Science.

## 34.32 / *Poultry Science*

Department of Animal Science

POULT 352. *Principles and Practices of Poultry Production.* ♦3 (Second Term, 3-3).

POULT 453. *Applied Poultry Genetics.* ♦3 (Second Term, 3-3). Prerequisite: Animal Science 484 or permission of the Department.

POULT 455. *Applied Poultry Nutrition.* ♦3 (Second Term, 3-3). Prerequisite: Animal Science 468 or permission of the Department.

POULT 459. *Processing Poultry and Poultry Products.* ♦3 (First Term, 3-0).

POULT 460. *Poultry Diseases and Hygiene.* ♦3 (First Term, 3-3).

## 34.33 / *Rural Sociology*

Departments of Agricultural Economics and Sociology

R SOC 300. *Introduction to Rural Sociology.* ♦3 (First Term, 3-0). Note: Not open to students who have credit in Sociology 202.

R SOC 356. *Sociology of Rural Life.* See INTER D 356.

R SOC 456. *Rural Social Problems and Public Policy.* See INTER D 456.

R SOC 457. *Theory and Practice in Rural Extension.* ♦3 (either term, 3-0). How farm people accept new ideas. Processes in planning and developing effective extension programs for rural people.

R SOC 458. *Agrarian Social Movements.* See INTER D 458.

R SOC 459. *Sociology of Community Development.* See INTER D 459.

R SOC 556. *Human Resources Development.* ♦3 (either term, 3-0). Social and economic development in various areas of Canada and other countries. Prerequisite: Agricultural Economics 453 and Interdepartmental Course 356 or consent of the Department.

R SOC 557. *Comparative Rural Societies.* ♦3 (either term, 3-0). The structure and characteristics of rural societies in various countries, with emphasis upon adjustment to change in social and economic institutions. Prereqisuite: R SOC 456 or consent of the Department.

## 34.34 / *Russian*

Department of Slavonic Languages

RUSS 210. *Beginners' Russian (Science Section).* ♦6 (3-0). Note: Designed to meet the needs of honors students in the science departments, students of the faculties of Engineering, Agriculture, Dentistry, Medicine and Graduate Studies of any year who require a reading knowledge of Russian scientific literature. Not open to general program students.

## 34.35 / *Sociology*

SOC 202. *Introductory Sociology.* ♦6 (3-0). An analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society analysed in terms of its structure, culture, and social ranking schemes. The interrelationships between the various institutions (e.g. family, church, school, government). The processes whereby the individual is socialized into society; the sources of conformist and non-conformist behavior. Note: Third-year or more advanced students are encouraged to take Sociology 403 rather than 202.

## 34.36 / *Soil Science*

SOILS 240. *Introduction to Soil Science.* ♦3 (First Term, 3-3). Origin and classification of soil materials; physical properties of mineral soils; soil water and soil air in relation to plant growth; soil colloids, soil temperature, soil conservation; organic soils. Textbook: Buckman and Brady, *The Nature and Properties of Soils,* sixth edition.

SOILS 250. *Introduction to Soil Chemistry and Fertility.* ♦3 (Second Term, 3-3). Soil pH and its control; soil salinity; soil organisms; soil organic matter; supply and availability of nitrogen, phosphorous, potassium and sulphur; fertilizers; cropping systems. Prerequisite: Soils 240 or permission. Textbook: Buckman and Brady, *The Nature and Properties of Soils,* sixth edition.

SOILS 300. *General Soil Science.* ♦6 (3-0). General principles of soil composition, soil genesis, and classification. Soil-environmental relationships. Major soil groups of the world. Note: Designed for students in faculties other than Agriculture.

SOILS 420. *Soil Classification.* ♦3 (First Term, 3-3). Soil genesis, morphology, taxonomy, and regional distribution, with emphasis on Canadian soils. Soil cartography—purpose and methods thoughout the world. Prerequisite: Soils 240 and 250, or consent of the Department.

SOILS 421. *Special Topics in Soil Classification.* Intensive field and laboratory study of some Alberta soils, requiring the preparation of a comprehensive written report.

SOILS 425. *Applied Soil Classification.* ♦3 (Second Term, 3-3). Interpretation of soil morphology and laboratory-measured properties in relation to field characteristics; criteria used for land classifications; different land classification systems; the interpretation and use of soil survey reports in agriculture, forestry, and engineering. Prerequisite: Soils 420 or consent of the Department.

SOILS 430. *Soil Microbiology.* ♦3 (Second Term, 3-3). Soil organisms and factors influencing their activity; the carbon, nitrogen, phosphorus and sulphur cycles; interactions between the soil microflora and herbicides, pesticides, etc.; soil sterilization; the rhizosphere; the biological factor in soil genesis. Prerequisite: Microbiology 201 or Microbiology 360 or permission.

SOILS 450. *Soil Colloids.* ♦3 (Second Term, 3-3). Colloidal materials in the soil, both inorganic and organic; mineralogy of clays; chemical composition; cation exchange; amounts and activities of exchangeable ions; flocculation; oxides and hydroxides. Prerequisite: Soils 240 and 250 or permission.

SOILS 460. *Soil Fertility.* ♦3 (First Term, 3-3). Sources of plant nutrients in the soil; nutrient availability as effected by soil conditions; soil colloids and ion exchange; ion uptake by plant roots; concepts of soil fertility; methods of assessing soil fertility. Prerequisite: Soils 240 and 250 or permission.

SOILS 470. *Irrigation and Drainage.* ♦3 (First Term, 3-0). Character of soil and water used for irrigation; methods of irrigation; measurement and distribution; duty; time and amount of application; removal of excess water; control of alkali; irrigation practices for various crops and soils; effects of fertility. Prerequisite: Soils 240 and 250 or permission. Textbook: Israelsen and Hansen, *Irrigation Principles and Practices.*

SOILS 480. *Soil Conservation.* ♦3 (Second Term, 3-0). Fundamentals of wind and water erosion; conservation practices; erosion and productivity; land use capability; conservation and history. Prerequisite: Soils 240 and 250 or permission.

SOILS 501. *Special Topics and Problems.* ♦3. Intensive study of a topic or problem and preparation of a written report.

SOILS 520. *Pedology.* ♦3 (Second Term, 3-3). Systematics of soil classification throughout the world with special emphasis on distribution, morphology, and physical, chemical and mineralogical characteristics of soils as related to their genesis; application of micro-pedological techniques to the study of soil fabrics; use of aerial photographs for soil mapping purposes. Prerequisite: Soils 420. Note: Offered in alternate years.

SOILS 521. *Advanced Soil Chemistry.* ♦3 (First Term, 3-3). More complex chemical reactions and properties of soil systems. Prerequisite: Soils 450 or permission.

SOILS 530. *Advanced Soil Microbiology.* ♦3 (First Term, 3-3). Microbiology or organic matter decomposition and humus formation; microbiology of nitrogen and mineral transformations, bacteriophages, and predatory micro-organisms. Prerequisite: Soils 430 or permission.

SOILS 531. *Advanced Soil Physics.* ♦3 (Second Term, 3-3). Physical properties of soils as they relate to mechanical composition, consistency, structure, aeration, tillage, erosion, and other factors affecting plant growth. Prerequisite: Soils 470 or permission.

SOILS 631. *Seminar.* ♦1 (1-0). Note: Attendance required of all graduate students.

## 34.37 / *Statistics*

Department of Mathematics

STAT 205. *Introductory Statistics.* ♦3 (either term, 3-2). Tabulation, graphical representation and reduction of data. Measures of location and dispersion. Elementary probability. Binomial and normal distributions. Curve fitting and the chi-square test of goodness-of-fit. Elements of sampling. Testing statistical hypotheses, confidence intervals. Prerequisite: Mathematics 30 or equivalent.

STAT 241. *Introductory Probability.* ♦3 (Second Term, 3-1). Probability models. Sampling. Product models. Conditional probability. Random variables. Special distributions. Multivariate distributions. Prerequisite: Mathematics 240 or equivalent.

STAT 255. *Elementary Statistics.* ♦6 (3-3). Graphs, tables, diagrams. Frequency distributions, averages, dispersion, moments. Elementary probabiilty. Binomial, normal and Poisson distributions. Sampling. Regression and correlation. Significance tests. Applications to data in various fields. Prerequisite: Mathematics 30 or equivalent.

STAT 341. *Statistical Methods.* ♦3 (First Term, 3-0). Sampling distributions. Point and interval estimations. Desirable properties of estimates. Hypothesis testing. Normal, chi-square, t- and F-tests. Types of error. Linear models: analysis of variance, regression, multiple comparison, simple design. Prerequisite: Statistics 241.

STAT 450. *Probability and Statistics.* ♦6 (3-0). Theory of probability. Distribution functions and characteristic functions. Central Limit theorem. Sampling. Exact sampling distributions. Confidence intervals. Maximum likelihood. Method of least squares. Analysis of variance. Statistical inference. Prerequisites: Mathematics 304 and preferably Statistics 255 or equivalent.

## 34.38 / *Veterinary Science*

Department of Animal Science

VET SC 300. *Introductory Veterinary Medicine.* ♦3 (First Term, 3-0).

## 34.39 / *Weed Science and Crop Ecology*

Department of Plant Science

WD SC 352. *Weeds and Weed Control.* ♦3 (Second Term, 3-3). Crop-weed relationships, methods of control, herbicide properties and uses, weed identification. Other uses of plant growth regulators.

WD SC 470. *Physiology of Herbicidal Action.* ♦3 (First Term, 3-3). Absorption, translocation, degradation, mechanism of action. Prerequisites: Weed Science 352; Botany 320 or Plant Physiology and Biochemistry 400.

WD SC 501. *Reading Project Course.* ♦up to 6, depending on work done. A written report on a selected problem.

WD SC 502. *Research Project Course.* ♦up to 6, depending on work done. A written report on investigation of a selected problem.

## 34.40 / *Zoology*

COURSES:
ZOOLOGY

ZOOL 320. *Vertebrate Biology.* ♦6(2-4). Prerequisite: Biology 230 or consent of the Department.

*Some of the buildings at the University's Kinsella ranch; The Faculty owns or leases several large tracts for research purposes.*

*Dr. D. E. Smith (centre), Dean of the Faculty of Arts with F. D. Blackley and E. J. H. Greene, Associate Deans.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# *Faculty of Arts*

## 41 / INTRODUCTORY

### 41.1 / *Members of the Faculty*

#### 41.1.1 / OFFICERS OF THE FACULTY

*Dean*
D. E. SMITH, Ph.D.

*Associate Deans*
F. D. BLACKLEY, Ph.D.
E. J. H. GREENE, D.U.

*Assistant Dean*
R. C. SMITH, Ph.D.

*Faculty Secretary*
R. J. MIDDLEDITCH, B.A.

#### 41.1.2 / DEPARTMENT OF ANTHROPOLOGY

*Associate Professor and Chairman*
C. S. BRANT, Ph.D.

*Associate Professors*
H. B. BARCLAY, Ph.D.
A. L. BRYAN, Ph.D.
S. SNYDER, Ph.D.

*Assistant Professors*
B. A. COX, M.A.
A. D. FISHER, Ph.D.
R. FRUCHT, Ph.D.
(Mrs.) R. GRUHN-BRYAN, Ph.D.
S. M. PIDDOCKE, M.A.

#### 41.1.3 / DEPARTMENT OF ART

*Professor and Head*
R. A. DAVEY, B.A.

*Visiting Professors*
N. K. GREENE, N.D.D.
J. IHLE, M.A.
W. JUNGKIND.

*Associate Professors*
D. R. BENNETTS, A.T.D.
(Miss) H. J. DOW, Ph.D.
J. A. FORBES, M.A.
J. B. TAYLOR, A.O.C.A.
E. N. YATES, A.O.C.A.

*Assistant Professors*
B. BENTZ, M.F.A.
L. D. CANTINE, M.A.
P. DARRAH, Dip.F.A.
V. HAMMOCK, M.F.A.
V. JOHNSON, M.F.A.
J. KNOWLTON, M.A. (on leave, 1968-69)
J. MOORE, B.A.
R. W. SINCLAIR, M.A.
(Miss) J. A. SYBESMA, M.F.A., M.A.

*Lecturers*
(Miss) G. BAUM, M.F.A.
M. J. TRAVERS, Dip.A.D.

#### 41.1.4 / DEPARTMENT OF CLASSICS

*Professor and Head*
R. J. BUCK, Ph.D.

*Associate Professors*
G. HERMANSEN, Ph.D.
E. C. MAY, Ph.D.
(Miss) M. W. MacKENZIE, Ph.D.

*Assistant Professors*
R. E. BRAUN, A.M.
K. GARBRAH, B.Litt.
R. F. KOTRC, M.A.
(Mrs.) R. NIELSON, Ph.D.
A. SMALL, M.A.
R. C. SMITH, Ph.D.

#### 41.1.5 / DEPARTMENT OF DRAMA

*Professor and Head*
G. B. PEACOCK, M.F.A. (on leave, 1968-69)

*Associate Professors*
F. F. BUECKERT, M.A. (acting head)
B. ENGEL, M.F.A.
L. KADLEC, M.F.A.
C. T. PEACOCKE, M.F.A.
J. H. TERFLOTH, Ph.D.

*Assistant Professors*
(Miss) M. FAULKES, L.U.D.
L. FELDMAN, M.F.A.
A. D. FRANCIS, M.A.
(Miss) G. KEATLEY, A.O.C.A.
(Mrs.) J. OGG, M.A.
(Miss) G. REHRIG, M.F.A.

#### 41.1.6 / DEPARTMENT OF ECONOMICS

*Professor and Head*
W. D. GAINER, Ph.D.

*Professors*
E. J. HANSON, Ph.D.
T. L. POWRIE, D.Phil.

*Associate Professors*
M. F. BAUER, Ph.D.
E. BERG, Ph.D.
R. P. CIRILLO, M.Sc.
J. J. DELEHANTY, B.S.
S. E. DRUGGE, Ph.D.
I. MORAVCIK, Ph.D.
C. STEINBERG, M.A.
M. D. STEWART, Ph.D.
B. VON HOHENBALKEN, Ph.D.
B. W. WILKINSON, Ph.D.

*Assistant Professors*
A. BUSE, Ph.D.
K. L. GUPTA, Ph.D.
(Mrs.) K. L. KLAWE, M.A.
M. S. NOORZOY, Ph.D.
C. C. NUNN, M.Sc.
R. PENDERGAST, Ph.D.
V. SALYZYN, Ph.D.
A. A. WARRACK, Ph.D.

*Lecturer*
(Miss) B. L. HODGINS, B.A.

## 41.1.7 / DEPARTMENT OF ENGLISH

*Professor and Chairman*
R. G. BALDWIN, Ph.D.

*Professor and Associate Chairman*
A. T. ELDER, Ph.D.

*Professors*
D. R. GODFREY, Ph.D.
H. KREISEL, Ph.D.
R. D. McMASTER, Ph.D.
E. J. ROSE, Ph.D.
A. A. RYAN, M.A., Provost, Executive Assistant to the President
W. WATSON, Ph.D. (on leave)

*Associate Professors*
F. BESSAI, Ph.D.
J. W. BILSLAND, Ph.D.
(Mrs.) B. N. DE LUNA, Ph.D.
J. F. FORREST, Ph.D.
E. G. GRIFFIN, Ph.D. (on leave)
H. A. HARGREAVES, Ph.D.
J. F. LAUBER, Ph.D.
(Miss) J. A. MacINTYRE, Ph.D.
G. S. McCAUGHEY, M.A. (on leave)
J. O. ORRELL, Ph.D.
A. H. QURESHI, Ph.D.
M. L. ROSS, Ph.D.
(Mrs.) S. M. WATSON, Ph.D. (on leave)
(Miss) A. G. WHITE, Ph.D.

*Assistant Professors*
B. L. ALMON, M.A.
R. F. ANDERSON, Ph.D.
(Mrs.) D. E. BESSAI, M.A.
E. D. BLODGETT, M.A.
D. C. BUTLER, M.A.
F. D. CLANDFIELD, M.A.
(Miss) J. D. W. CROWTHER, Ph.D.
R. J. S. GRANT, M.A.
M. R. LEGRIS, M.A.
(Miss) D. LIVESAY, M.Ed.
(Mrs.) J. S. McMASTER, Ph.D.
J. M. NELSON, Ph.D.
(Mrs.) L. D. NOUJAIM, M.A.
N. J. PARKER-JERVIS, B.A., Dip.Ed.
J. R. POLK, Ph.D.
(Mrs.) S. ROSE, Ph.D.
G. SAMUEL, M.A.
R. G. SIEMENS, Ph.D.
R. H. SOLOMON, M.A.
R. D. WEAVER, M.Ed.
R. H. WIEBE, M.A.
(Miss) M. D. WILKIE, M.A.
R. R. WILSON, M.A.

*Lecturer*
R. T. HARRISON, M.A.

## 41.1.8 / DEPARTMENT OF GERMANIC LANGUAGES AND GENERAL LINGUISTICS

*Professor and Head*
E. REINHOLD, Ph.D.

*Professor and Head of Division of General Linguistics*
C. I. J. M. STUART, M.A.

*Associate Professors*
J. M. ANDERSON, Ph.D.
M. V. DIMIC, Dip.
G. MARAHRENS, Ph.D. (on leave)
(Miss) A. SCOTT, Ph.D.
G. S. WALDO, Ph.D.

*Assistant Professors*
R. J. E. D'ALQUEN, Ph.D.
(Mrs.) C. DIMIC, Ph.D.
E. EGERT, Ph.D.
(Miss) M. L. MARCKWORTH, M.A.
S. R. MUNRO, M.A. (on leave)
G. D. PRIDEAUX, Ph.D.
H. K. STANFORD, M.A.
J. WHITON, Ph.D.

*Lecturers*
(Mrs.) S. M. NIMMO, M.A.
(Miss) M. J. WELLS, M.A.

## 41.1.9 / DEPARTMENT OF HISTORY

*Professor and Chairman*
L. H. THOMAS, Ph.D. (to summer 1968)

*Professors*
F. D. BLACKLEY, Ph.D.
L. G. THOMAS, Ph.D.
C. J. LOWE, Ph.D.

*University Professor*
J. BARRINGTON, B.Sc.

*Associate Professors*
F. A. DE LUNA, Ph.D.
B. L. EVANS, Ph.D.
W. D. B. HEENEY, D.Phil.
W. J. JONES, Ph.D. (on leave, 1968-69)
(Mrs.) H. P. LIEBEL-WECKOWICZ, Ph.D.
G. A. ROTHROCK, Ph.D. (on leave, 1968-69)
(Miss) A. THIMME, Dr.Phil.
U. TRUMPENER, Ph.D.

*Assistant Professors*
D. H. DINWOODIE, Ph.D.
J. A. EAGLE, M.A.
R. R. HETT, B.A.
(Miss) H. J. JONES, Ph.D.
M. KATZ, Ph.D. (on leave, 1968-69)
C. S. MacKINNON, Ph.D.
(Miss) C. MARTIN, B.Litt.
(Mrs.) M. RECKORD, Ph.D.
W. R. SAMPSON, M.A.
K. C. TAYLOR, M.A.
J. N. WICKENDEN, Ph.D. (on leave, 1968-69)

*Joint Appointment*
C. F. JOHNSTON, Th.D. (St. Stephen's College)

## 41.1.10 / DEPARTMENT OF MUSIC

*Associate Professors*
(Miss) V. B. ARCHER, M.Mus.
A. B. CRIGHTON, D.M.A.
T. ROLSTON, A.R.A.M.
M. SASONKIN, Ph.D.
R. A. STANGELAND, A.Mus.D.

*Assistant Professors*
J. ILTIS, M.Mus.
C. E. KENNESON, M.Mus.
E. B. LEJANO, A.Mus.D.
G. E. LINCOLN, L.R.S.M.
(Miss) A. M. MUNN, Dip. (Juilliard)

## 41.1.11 / DEPARTMENT OF PHILOSOPHY

*Professors*
A. M. MARDIROS, M.Litt. (on leave)
H. TENNESSEN, Magister Artium (on leave)

*Associate Professors*
D. C. HICKS, Ph.D.
G. PRICE, M.A.

*Assistant Professors*
R. N. BOSLEY, M.A. (on leave)
D. A. CODER, A.B.

W. EASTMAN, Ph.D. (acting head)
M. H. KELLEY, M.A.
E. W. KEMP, M.A.
J. C. MacKENZIE, M.Litt.
K. I. MILLS, B.Phil.
P. A. SCHOULS, Ph.D.
R. A. SHINER, M.A.
F. P. VAN DE PITTE, Ph.D.
(Mrs.) M. VAN DE PITTE, Ph.D.

*Visiting Professor*
J. KING-FARLOW, Ph.D.

## 41.1.12 / DEPARTMENT OF POLITICAL SCIENCE

*Professor and Head*
C. BAY, Ph.D.

*Professors*
B. R. BOCIURKIW, Ph.D.
G. R. DAVY, Ph.D.
F. C. ENGELMANN, Ph.D.
L. C. GREEN, LL.B.

*Associate Professors*
R. BAIRD, Ph.D.
N. O. LINTON, Ph.D.
T. C. POCKLINGTON, Ph.D.
S. M. M. QURESHI, Ph.D.

*Assistant Professors*
R. R. GILSDORF, M.A.
T. HARVEY, M.A.
F. G. HULMES, M.A.
J. P. JOHNSTON, M.A.
J. A. LEJNIEKS, M.A.
J. K. MASSON, M.A.
J. P. MEEKISON, Ph.D.
R. A. MELVIN, B.A.
J. F. REYNOLDS, A.B.

*Visiting Assistant Professor*
H. H. HUTTER, M.A.

## 41.1.13 / DEPARTMENT OF PSYCHOLOGY

*Professor and Head*
T. M. NELSON, Ph.D.

*Professors*
L. VON BERTALANFFY, Ph.D.
E. HOWARTH, Ph.D.
J. R. ROYCE, Ph.D.
W. W. ROZEBOOM, Ph.D.
W. N. RUNQUIST, Ph.D.
P. SWARTZ, Ph.D.

*Visiting Professor*
K. DABROWSKI, M.D., Ph.D.

*Associate Professors*
W. A. BLANCHARD, Ph.D.
N. M. GINSBURG, Ph.D.
A. J. B. HOUGH, M.A.
P. P. REMPEL, Ph.D.
(Mrs.) B. G. RULE, Ph.D.
S. J. RULE, Ph.D.
D. SPEARMAN, Ph.D.
R. E. WALLEY, Ph.D.
T. E. WECKOWICZ, Ph.D.
K. V. WILSON, Ph.D.

*Assistant Professors*
R. M. ARVIDSON, Ph.D.
A. R. DOBBS, Ph.D.
D. LANDY, Ph.D.
(Mrs.) B. H. SCHAEFFER, Ph.D.
D. L. SCHAEFFER, Ph.D.

*Sessional Lecturer*
(Mrs.) C. LARSEN, Ph.D.

## 41.1.14 / DEPARTMENT OF RELIGIOUS STUDIES

*Professor and Head*
C. DAVIS, S.T.L.

## 41.1.15 / DEPARTMENT OF ROMANCE LANGUAGES

*Professors*
E. DORFMAN, Ph.D.
M. FAUCHER, Lic. en Droit
E. J. H. GREENE, D.U.
C. H. MOORE, D.U.

*Associate Professors*
(Miss) C. K. A. COLTER, B.A. (on leave)
A. B. CONNELL, D.U.
J. FERRATE, Lic. en Let.
R. G. MOTUT, M.A.
G. SAMUEL, M.A.

*Assistant Professors*
A. J. BALLAH, M.A.
M. BAREAU, Dipl. d'Et. Sup.
E. D. BLODGETT, M.A.
R. C. BONVALET, M.A.
(Mrs.) J. A. CREORE, M.A.
(Mrs.) C. A. DIMIC, Ph.D.
B. G. DOBBS, M.A.
A. M. FORCADAS, Ph.D.
(Mrs.) M. S. GARFINKLE, M.A.
(Miss) A. J. HOLDEN, M.A.
M. KALINOWSKY, M.A.
E. MARXHEIMER, M.A. (Administrator of the Language Laboratory)
P. A. R. MONOD, M.A.
(Mrs.) D. MUSACCHIO, Dipl. d'Et. Sup. (on leave)
E. MUSACCHIO, Dot. in fil. (on leave)
J. POLO, Dr. Fil.
P. A. ROBBERECHT, M.A.
(Mrs.) M. H. SABATINI, M.A.

*Lecturers*
(Mrs.) N. E. BONVALET, Agr.
D. P. FEARON, M.A.
P. L. KNIGHT, M.A.

## 41.1.16 / DEPARTMENT OF SLAVONIC LANGUAGES AND LITERATURES

*Professor and Chairman*
O. STARCHUK, Dr. Jur. et Rer. Pol.

*Associate Professor*
Y. SLAVUTYCH, Ph.D. (on leave, 1968-69)

*Assistant Professors*
T. R. CARLTON, M.A.
K. T. HOLDEN, M.A.
J. L. LAYCHUK, M.A.
W. R. NOVAKSHONOFF, M.A. (on leave, (1968-69)
G. H. SCHAARSCHMIDT, M.A. (on leave)
O. ZUJEWSKYJ, Ph.D.

*Joint Appointment*
C. N. SUCHOWERSKY, Dr. Jur. et Rer. Pol. (Cameron Library)

## 41.1.17 / DEPARTMENT OF SOCIOLOGY

*Professor and Head*
G. K. HIRABAYASHI, Ph.D.

*Professors*
J. FORSTER, Ph.D.
C. W. HOBART, Ph.D.

**ARTS**

*41.1.17*

**ACADEMIC STAFF**

K. J. KROTKI, Ph.D.
G. NETTLER, Ph.D. (on leave)

*Associate Professors*

B. R. ABU-LABAN, Ph.D.
M. BEQUIRAJ, Ph.D.
S. FISHER, Ph.D.
J. C. HACKLER, Ph.D.
C. A. S. HYNAM, Ph.D.
G. KUPFER, Ph.D.
R. H. OGLES, Ph.D.
W. B. ROGERS, Ph.D.

*Assistant Professors*

(Miss) S. BALL, Ph.D.
K. R. CUNNINGHAM, B.A. (on leave)
H. C. ELLIOTT, M.A.
(Miss) M. HENDRICKSON, Ph.D.
R. HUGHES, M.A.
D. LARSEN, Ph.D.
L. E. LARSON, Ph.D.
V. MATTHEWS, Ph.D.
C. A. MEILICKE, Ph.D.
W. MELOFF, M.A.
A. S. A. MOHSEN, M.A.

*A scene from Turgenev's "A Month in the Country," one of the many plays produced in the Studio Theatre of the Department of Drama.*

D. MURRI, M.A.
R. M. PIKE, Ph.D.
(Miss) P. RICHMOND, Ph.D.
D. WHITESIDE, Ph.D.

*Lecturer*
W. W. McVEY, Jr., M.A.

### 41.1.18 / ADDITIONAL MEMBERS OF FACULTY COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Professors*
M. L. HOWELL, M.A. (Physical Education)
L. LORCH, Ph.D. (Mathematics)
W. PILKINGTON, M.A. (Education)

*Associate Professors*
H. BENTLEY, M.Sc. (Household Economics)
J. F. BERGMANN, Ph.D. (Geography)
H. A. K. CHARLESWORTH, Ph.D. (Geology)
G. FARMER, Ph.D. (Secondary Education)
L. C. LEITCH, LL.B. (Business Administration and Commerce)
R. F. RUTH, Ph.D. (Zoology)

*Other Members*
A. J. B. HOUGH, M.A., Director, Student Counselling Services
H. KREISEL, Ph.D., Associate Dean of Graduate Studies
P. P. REMPEL, Ph.D., Counsellor, Student Counselling Services
G. SAMUEL, M.A., Administrator, Professional Examinations

*Registrar of the University*
A. D. CAIRNS, B.A.

## 41.2 / *General Information*

The Faculty of Arts is, with the Faculty of Science, the oldest established faculty at The University of Alberta, instruction in Arts and Science having begun in 1908. It offers instruction in classical and modern languages and literatures; history, philosophy, and religion; the social sciences; and the fine arts.

The Faculty offers two main types of programs leading to the degree of B.A.: four-year Honors programs and three-year General programs.

Regulations governing honors and general programs will be found in § 43.1, below, followed by descriptions of these programs under subject headings in §§ 43.2 to 43.20.

In addition, the Faculty participates with the Faculty of Law in a combined program leading to the degrees of B.A., LL.B., described in § 43.21; and offers specialized degrees in Art and Drama (Bachelor of Fine Arts) described in §§ 43.23 and 43.24, and in Music (Bachelor of Music), described in § 43.25. Two-year pre-Dental and pre-Medical programs may be taken in the Faculty as described in § 43.26.

# 42 / FACULTY REGULATIONS

## 42.1 / *Admission*

The admission requirements of the Faculty of Arts will be found in §§ 13.1 and 13.3 of the University Regulations section of the Calendar.

## 42.2 / *Courses*

(1) *Selection of courses.* Students registered in the Faculty of Arts must select courses from those set out in the Faculty of Arts and Faculty of Science sections of the Calendar (§§ 44 and 184). In rare instances, courses from other faculties or schools may be permitted by the Dean.

(2) *Selection of first-year courses.* A student shall restrict his first-year registration to junior courses in five different subjects. Senior courses may be taken in the first year only with the consent of the department concerned and the approval of the Dean.

(3) *Half-courses.* A number of courses are offered in one term only; two such courses are recognized as the equivalent of one full course. Where the curriculum requires a full course in a particular subject or classification, both half-courses must be chosen from that subject or classification; where the requirement is for an option, any two half-courses may be combined to meet the requirement. Half-courses are not open to first-year students.

(4) *Classification of courses.* For administrative purposes, courses offered in the Faculties of Arts and Science are classified as follows:

"Humanities": Art; Biblical Literature (St. Stephen's College); Classics 240, 350, 351, and 354; Comparative Literature; Drama; English; French; German; Greek; Hebrew (St. Stephen's College); Household Economics 352; Italian; Latin; Linguistics; Music; Polish; Russian; Scandinavian; Serbo-Croatian; Slavonics; Spanish; Ukrainian.

"Social Sciences": Anthropology (except 390); Classics (except as listed above); Christian Theology (St. Joseph's College); Economics; Geography (courses listed in the

Arts section of the Calendar); History; Philosophy; Political Science; Psychology (courses listed in the Arts section of the Calendar); Sociology (except 311).

"Natural Sciences": Anthropology 390; Astronomy; Bacteriology; Biochemistry; Biology; Botany; Chemistry; Computing Science; Entomology; Genetics; Geography (courses listed in the Science section of the Calendar); Geology; Mathematics; Microbiology; Physical Science; Physics; Physiology; Plant Biochemistry and Physiology; Psychology (courses listed in the Science section of the Calendar); Sociology 311; Statistics; Zoology.

Religious Studies has not yet been classified.

(5) *Withdrawal from courses.* The deadlines for withdrawing from courses are as follows: from a full course, February 24; from a half-course offered in the First Term, November 15; from a half-course offered in the Second Term, March 10.

## 42.3 / *Academic Standings and Graduation*

The following regulations apply throughout the Faculty of Arts:

(1) The privilege of repeating a year will be granted to a student not more than once during his candidacy for a degree in this Faculty, unless by special permission of the Dean.

(2) To continue in the Faculty, a student who is repeating a year must demonstrate ability to meet graduation standards by attaining a grade-point average of 5.0 in the repeated year. If he does not, he must withdraw from the Faculty of Arts; he may be re-admitted later if he has achieved graduation standards in another Faculty.

Further regulations regarding academic standing, promotion, and graduation vary from program to program within the Faculty of Arts, and are therefore given together with the details of the program to which they apply in § 43, below. Regulations for the B.A. degree will be found in § 43.1; for the combined B.A., LL.B. program in § 43.21; for the B.F.A. in §§ 43.23 and 43.24; for the B.Mus. in § 43.25; and for pre-Medical and pre-Dental programs in § 43.26.

# 43 / PROGRAMS OF STUDY

## 43.1 / *The Degree of B.A.— General Information*

### 43.1.1 / THE DEGREE OF B.A. WITH HONORS

Programs leading to the degree of Bachelor of Arts with Honors are four years in length. They are designed to provide specialization in the chosen subject or subjects together with a longer training than that in the general program, as well as the higher standard implied by the term "honors".

*Admission.* Most departments provide a special first year for students who wish to read for honors. Permission to enter first-year honors is granted to students with high matriculation standing and with the approval of the department concerned. A request for this privilege should be made on the "Application for Admission" form or through the head of the department not later than the time of registration.

A student need not commit himself to honors in his first year, and may register in an appropriate selection of courses as required by the regulations of a general program. If he obtains a sufficiently high standard in his first year and is recommended by the department concerned, he may enter honors in his second year. A student desiring to do so must apply to the Dean, through the chairman of the department concerned, preferably during his first year and in any case not later than the time of registration for the second year.

Consideration will also be given to applications for transfer to honors submitted by students who have completed the second, or even the third, year of another program.

*Selection of courses.* The following regulations govern honors programs:

(1) In each year, an honors student's program must be approved by the head of his department and by the Dean.

(2) A student is not permitted to confine his studies to one discipline; during his first three years he must take at least three courses not closely related to his subject of specialization. For example, a student specializing in a subject administratively

classified as a "humanity" must take at least three courses classified as "social sciences" or "natural sciences"; a student specializing in a subject administratively classified as a "social science" must take at least three courses classified as "humanities" or "natural sciences".

(3) In the third and fourth years considerable latitude is permitted in order to meet the needs of individual students. A student may choose to concentrate closely on one subject or to widen his field of study. In the latter case he will not be required to take, over the four years, more than ten courses in the subject of concentration.

*Academic standings and graduation.* The following regulations govern honors programs:

(1) Promotion from first year to second year, as well as from second to third and from third to fourth, is by recommendation of the department concerned, for which a grade-point average of at least 5.5 is required.

(2) A student who fails to attain the standard necessary for continuance in honors at the end of his first year must transfer to another program and must complete all its requirements. The special first-year honors programs are so designed that a student can proceed to a degree in a four-year program or in the general program without penalty.

(3) A student who is not recommended to continue in honors at the end of his third year, or who fails to complete the requirements for a degree with honors in his fourth year, may be granted the general degree forthwith, provided that the courses he has taken and the standing attained are satisfactory. Otherwise he may be required to take one or more additional courses in a subsequent Summer or Winter Session.

(4) A student who, for any reason, is unable to return to university for the fourth year may apply for a general degree under the same conditions as one who has failed to meet the required standards.

(5) An honors program may be interrupted only by special permission of the Council of the Faculty.

(6) Degrees with honors are awarded in two classes, First Class Honors and Honors. For First Class Honors a grade-point average of at least 7.5 is required; for Honors, of 5.5.

### 43.1.2 / THE DEGREE OF B.A. IN THE GENERAL PROGRAM

The general program in the Faculty of Arts is designed to enable the student to obtain a diversified training in more than one branch of study within the limits of a three-year program. The basic outline of the program is as follows:

*First year*: English 200; an Arts course; a laboratory Science course; two options; Physical Education.

*Second year*: An Arts course; a Science course; three options.

*Third year*: An Arts course; four options.

The following regulations govern the program:

(1) Each student must include in his program a minimum of three courses and a maximum of five in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration.

(2) No student may include more than seven junior courses in his program, except by special permission of the Dean.

(3) A student registering for the B.A. degree must choose his principal subject of concentration in the humanities or social sciences or mathematics. To obtain a B.A., the student must present credit in at least eight Arts courses.

(4) To obtain a B.A., a student must present a grade of 4 or better in a minimum of fourteen full courses, not less than a grade of 3 in a fifteenth course (provided this is not a course in a subject of concentration), and a grade-point average of at least 5.0 in all courses credited to the degree after the first year.

(5) A student may not write more than two supplemental examinations in any year, whether for the purpose of obtaining passing marks or of raising his grade-point average to the required 5.0.

(6) A student may not write more than five supplemental examinations in his three-year program.

(7) In exceptional circumstances, the Dean may permit a student to proceed to a degree over a longer period than three years, or to meet the requirements in a shorter time by attending Summer Session or taking extra courses during the Winter Session.

(8) A student transferring to the Faculty of Arts with advanced standing will be required to complete at least five of his fifteen courses at The University of Alberta to qualify for the University's degree.

§§ 43.2 to 43.20 contain advice offered by the various Arts departments to students selecting courses in their subjects of concentration. Further information may be obtained by consulting members of the department concerned.

### 43.1.3 / OPTIONS

The term "option", where it appears in the following programs, means a course freely chosen by the student provided he has the

necessary prerequisites. An "approved option" in Honors, B.F.A., and B.Mus. programs is an option approved by the department directing the program of the student concerned.

## 43.2 / *Anthropology*

### 43.2.1 / HONORS IN ANTHROPOLOGY

B.A. with Honors will require eight to ten courses in Anthropology. Four to five courses will be taken in a related minor subject, depending upon the student's special area of interest in Anthropology. The remainder of the program will be composed of courses outside the field of Anthropology and the minor subject.

Departmental approval of the student's program must be secured prior to registration.

Before graduation, students will be required to demonstrate a reading knowledge of a modern language other than English.

In the final year of the Honors program the student will be required to pass a comprehensive examination which may be written, oral, or both; it may consist, in part, of a major research paper.

### 43.2.2 / CONCENTRATION IN ANTHROPOLOGY

Any combination of Anthropology courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

For those students who seek a more thorough grounding in the principles of the subject, the Department of Anthropology advises the following sequences:

*Three-course sequence*: Anthropology 202 and two senior Anthropology courses.

*Four-course sequence*: Anthropology 202 and three senior Anthropology courses (including one 400 level course).

*Five-course sequence*: Anthropology 202 and four senior Anthropology courses (including one 400 level course).

## 43.3 / *Art*

### 43.3.1 / CONCENTRATION IN ART

Any combination of Art courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

For the degree of B.F.A. in Art, see § 43.23 below.

## 43.4 / *Classics*

### 43.4.1 / GENERAL INFORMATION

A statement will be found below of the general schemes of courses required to obtain honors in this Department. It is not implied that these schemes must be rigidly followed: the Department is prepared to discuss with prospective or actual students reasonable equivalents designed to meet special needs or desires of the persons concerned. In the courses dealing with the literary history, the economic and political history, and the private life of the classical peoples, oral examinations may at any time replace written tests.

Students must consult the Department before choosing their courses and obtain departmental approval before registering.

### 43.4.2 / HONORS IN CLASSICS

Programs in this field require at least five courses beyond the 100 level in the classical language chosen as a major; three or four courses beyond the 100 level in the classical language chosen as a minor; Classics 352 and 353 or 358 (Greek and Roman History); and eight or nine options, one of which must be a Science course which should be taken in the first year, for a total of twenty courses. Study of at least one year of French or German is strongly recommended. Some of the optional subjects will be integrated with the program, while others should be general options.

### 43.4.3 / HONORS IN CLASSICS, ANCIENT HISTORY AND CLASSICAL ARCHAEOLOGY

Programs in these fields require at least three of Classics 352, 353, 354, 356, 358, 395, at least one of Classics 459, 461, 462, 465, 466, 467; three courses in Greek plus Greek 518 or 519 or 521 and 522; four courses in Latin; eight options, one of which must be a Science course in the first year, for a total of twenty courses.

### 43.4.4 / HONORS IN LATIN OR GREEK WITH AN APPROVED SECOND SUBJECT

A degree with Honors will be awarded in Latin or Greek with an approved second subject, such as English, French, German, Russian, Philosophy, etc.

Programs in these fields require at least five courses beyond the 100 level in Latin or Greek; at least four in the second subject; Classics 350 (Greek Life and Letters); Classics 351 (Latin Literature in Translation); *either* Classics 352 (Greek History), if the major language is Greek *or* Classics 353 or 358 (Roman History), if the major language is Latin; and eight options, one of which must be a Science course which should be taken in the first year, for a total of twenty courses. Programs will be arranged in consultation with the other departments concerned.

### 43.4.5 / COMBINED HONORS (LATIN AND FRENCH, LATIN AND ENGLISH, ETC.)

A degree with Honors in Latin and French, Latin and English, Latin and German, Latin and Russian, or Greek and Philosophy may be awarded to students following a program of studies similar to the one outlined for Honors in Latin and Greek, except that the number of senior courses in each Honors subject will be as nearly equal as possible (normally five each) and will be selected in accordance with departmental requirements. Approval of both Departments concerned is required before registration.

### 43.4.6 / CONCENTRATION IN CLASSICS

Both Greek and Latin may be begun at the University (Greek 100 and Latin 100). The course for students who enter the University with Latin 30 is normally Latin 200. From Greek 100 a student proceeds in his second year to Greek 300 and from Latin 100 to Latin 200 or Latin 300 depending on his standing. From Latin 200, a student goes forward to either Latin 300 or one of Latin 372, 373, 374, 375. It is possible for a general program student to take four courses in Latin and four in Greek.

General program students interested in combining a knowledge of the ancient world with a comparison of its cultures to modern civilization may form an area of concentration by making a selection from the courses offered by the Department in Early Civilization, Greek and Roman History, Ancient Art, and Greek and Latin Literature in translation.

## 43.5 / *Drama*

### 43.5.1 / CONCENTRATION IN DRAMA

Any combination of Drama courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

A student must present three full hours per week or their equivalent to receive credit for a full course.

For the degree of B.F.A. in Drama, see § 43.24 below.

## 43.6 / *Economics*

### 43.6.1 / HONORS IN ECONOMICS

*First year*: Economics 200; English 200; a laboratory science; two approved options; Physical Education.

*Second year*: Economics 300; Economics 380; Economics 399; an approved course in Calculus; an approved option.

*Third year*: Two courses in Economics; Economics 406; two approved options.

*Fourth year*: Three courses in Economics including Economics 404 if not taken previously and a course in the 500 range; two approved options.

Two of the approved options somewhere in the program must include courses in a modern language other than English (preferably French, German or Russian), either two courses in one language or one course in each of two languages. Accounting 202 and 204 together are acceptable as an option at any stage in the program as are additional courses in Economics. However, the student will not receive advanced standing in an M.A. program at this University for more than nine Economics courses taken in the undergraduate program.

Students wishing to undertake a program of Slavonic and East European studies may register for Honors in Economics. By choosing options according to the program requirements set out by the Interdepartmental Committee on Soviet and East European Studies, a student may qualify to have the notation "Slavonic and Soviet Studies" added to his record upon satisfactory completion of his program.

### 43.6.2 / CONCENTRATION IN ECONOMICS

Any combination of Economics courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

For those students who seek a more thorough grounding in the principles of the subject, the Department of Economics advises the following sequences:

*Three-course sequence*: Economics 200 and two senior Economics courses.

*Four-course sequence*: Economics 200, 301 and two other senior Economics courses.

*Five-course sequence*: Economics 200, 300, 380 and two other senior Economics courses.

General program students who may wish to transfer to the Honors program or to proceed later to graduate study in Economics should consult the Department. Such students are reminded that basic courses in Calculus and Statistics are prerequisite to graduate work in Economics at this University.

Students in the general program who elect the five-course sequence of concentration in Economics and who may wish to transfer to the Honors program later should select Economics 300 and 380 in their program as well as the appropriate courses in Modern Languages, Statistics and Mathematics.

## 43.7 / *English*

### 43.7.1 / HONORS IN ENGLISH

Students wishing to read for Honors in English should consult the head of the Department at the beginning of the first year. Students deciding during or at the end of the first year to undertake Honors in English must consult the head of the Department at the earliest possible moment in order to ascertain whether their first-year courses and their standing in these courses are acceptable as a basis for admission to Honors at the beginning of the second year; and in cases where the first-year courses do not seem to provide an adequate basis, to discuss what extra work should be taken to rectify the situation.

*First year*: English 200, French 200 or Latin 200 or German 200 or Italian 100 or, with permission, another language; an approved philosophy course; two approved options, one of which may be a second language.

*Second year*: Three senior English courses; continuation of the first language; an approved option, provided that language requirements have been met; English 501.

*Third year*: Three senior English courses; two approved options, provided that language requirements have been met; English 502. English 504 will be commenced in the spring of this year and continued throughout the fourth.

*Fourth year*: Two senior English courses; two approved options, both of which may be senior English courses if language requirements have been met; English 504 is to be continued and will count as a fifth course; English 503.

*Choice of senior courses*: Five of the senior English courses must be chosen so that each of the following periods of literature is represented: Old and Middle English, Renaissance, Seventeenth and Eighteenth Centuries, Nineteenth Century, Modern Period. At the discretion of the department, a student may take up to eleven full senior English courses. All courses are to be chosen in consultation with the head of the Department.

*Language requirements*: A student who begins his first language at University (one chosen to satisfy the language requirement of the first year) must continue it for two more years. If the language of the first year is a language of matriculation, it need be continued for one year only. A student who begins at University a second language (one elected as an approved option) must continue it for one more year, unless specially exempted.

### 43.7.2 / CONCENTRATION IN ENGLISH

Any combination of English courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

Students who choose English as a subject of concentration are advised to include in their program a language other than English.

## 43.8 / *General Linguistics*

### 43.8.1 / HONORS IN GENERAL LINGUISTICS

A B.A. degree with Honors may be awarded in General Linguistics and an approved second subject selected according to the special interests of the student, (e.g. Anthropology, German, French, Latin, Mathematics, Psychology, Russian, etc.).

The program will require seven or eight courses in General Linguistics, four to six in the second subject and six to eight approved options. English 200 and a laboratory science course are to be taken in the first year. Before graduating, students will have to demonstrate general proficiency (approximately equivalent to a 300-level language course) in a modern European language other than English.

Although a first-year course in General Linguistics is not available, students wishing to begin an honors program in General Linguistics are advised to consult the Department at the beginning of the first year. Students wishing to enter the honors program at the beginning of the second year should consult the Department regarding admission well before the end of the first year.

### 43.8.2 / CONCENTRATION IN GENERAL LINGUISTICS

Any combination of Linguistics courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

The Department of Germanic Languages and General Linguistics advises the following sequences:

*Three-course sequence*: Linguistics 350 and two other courses in Linguistics.

*Four-course sequence*: Linguistics 350, Linguistics 455, and three other courses in Linguistics.

*Five-course sequence*: Linguistics 350, Linguistics 455 and three other courses in Linguistics.

## 43.9 / *Geography*

### 43.9.1 / HONORS IN GEOGRAPHY

The Department offers both the B.A. and B.Sc. degrees with Honors in Geography.

An undergraduate may elect to read for Honors in Geography either at the beginning of the first year or after satisfactory completion of one or two years of the general B.A. or B.Sc. degree course. In any case he must consult the Chairman of the Department before being admitted to the Honors Program. The degree of B.A. or B.Sc. with Honors in Geography is awarded after: (1) proof of the candidate's ability to read either French or German; (2) attainment by the candidate of a satisfactory standard in a final comprehensive oral or written examination in the field of Geography at the end of the fourth year.

*First year*: Geography 201; English 200; two Arts options; Biology 130 or 230.

*Second year*: Geography 300; Geography 301; either Geography 302 or 303; two approved options.

*Third year*: Geography 400; one of Geography 302, 303, 401 416, 418 or 420; Zoology 321 and Botany 321; two approved senior options.

*Fourth year*: Geography 523; one of Geography 402, 404, 406, 408, 412, 414 or 422; three approved senior options.

Students are required to have a reading knowledge of French or German. At the end of the fourth year a candidate for honors will be required to take an oral or written examination in the field of Geography.

### 43.9.2 / CONCENTRATION IN GEOGRAPHY

Any combination of Geography courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

A student may count any Geography course, whether listed as an Arts or a Science course, as part of a concentration in Geography. The Department of Geography advises the following sequences:

*Three-course sequence*: Geography 201, 300 and one other senior Geography course.

*Four-course sequence*: Geography 201, 300 and two other senior Geography courses.

*Five-course sequence*: Geography 201, 300, 301, a regional course and one other senior Geography course.

Students interested in graduate work in Geography should consult the Department.

## 43.10 / *German*

### 43.10.1 / HONORS IN GERMAN

A degree with Honors will be awarded in German with an approved second subject such as English, French, History, Latin, Linguistics, Russian, etc.

The program will require seven or eight courses in German (which must include German 510 in the fourth year), four to six in the second subject, and six to eight approved options, for a total of twenty courses. In addition, all Honors students will take in each year such laboratory hours as may be deemed necessary to improve their oral proficiency.

English 200 and a Science course must be included in the first year. History 322 and Linguistics 350 are to be included in the second and third years.

All programs will be arranged in consultation with the other departments concerned and departmental approval of the program is required before registration.

### 43.10.2 / COMBINED HONORS IN GERMAN

A degree with Honors in German and English, German and French, German and Latin, German and Philosophy, German and Russian and other combinations may be awarded to students following a program of studies similar to the one outlined above, except that the number of senior courses in each subject will be as nearly as possible equal and selected in accordance with departmental requirements.

### 43.10.3 / CONCENTRATION IN GERMAN

Any combination of German courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum is not exceeded, and that prerequisite requirements are fulfilled.

The Department of Germanic Languages and General Linguistics advises the following sequences:

(1) *For students beginning the language at University*: German 100 in the first year; German 200 in the second year; up to three of German 330, 350, 370, 380, 385, 398, and 400 in the third year.

(2) *For students entering with matriculation German*: German 200 in the first year; one or two of German 330, 350, 370, 380, 385, 398, 400, in the second year; one or two of German 370, 380, 385, 400, 430, 450, 460, in the third year.

(3) *German-speaking students and students beginning their studies with more than matriculation German* may be admitted to courses numbering 330 and above in their first year, provided they pass a Departmental placement test and obtain the permission of the Dean of Arts. Such students are strongly advised to consult with the Department before registration.

German 330 and 350 may *not* be taken *after* any of the higher-numbered courses.

Senior, honors, and graduate courses in German literature will, in general, be conducted in German.

Students registering for the first time in German 350, 370, 380, 385 or 400 will be required to take a one-hour weekly *language tutorial* as part of that course. They will not be required to take the tutorial again if they register in another of these courses in a subsequent year.

## 43.11 / *History*

### 43.11.1 / HONORS IN HISTORY

An undergraduate may elect to read for honors in History either at the beginning of the first year or after satisfactory completion of one or two years of the general B.A. degree program. In any case he must consult the chairman of the Department before being admitted to the honors program. The degree of B.A. with Honors in History is awarded after satisfactory completion of an honors essay, proof by the candidate of his ability to read a modern language other than English, and the attainment of a satisfactory standard in the examinations taken in the third and fourth years, including a comprehensive examination.

*First year*: History 200, English 200, a language course other than English (usually French or German or Latin or Russian), an approved option (a course in Economics, Philosophy, Political Science, or Psychology is an example), a Mathematics or Science course (Geography 201 is suggested), Physical Education.

*Second year*: Second year honors seminar (History 399), two senior (300-level) courses in History, two approved options (Classics, Economics, English, Modern Languages, Philosophy, Political Science or Psychology for example), a further option (which may be a third History course).

*Third year*: Third year honors seminar (History 499); two advanced (400-level) courses in History, one of which should be in a field related to the topic proposed for the honors essay of the fourth year; a third course in History, which may be at the 300 or 400 level; two approved options.

*Fourth year*: An approved 500-level course in History; History 501 (preparation of the honors essay); a further course in History (which may be at the 300 level); an approved option from another Department. The language examination must also be taken this year, unless the student elects to take it earlier.

In certain circumstances courses in Ancient History offered by the Department of Classics are accepted in place of required senior and advanced courses in History.

Not later than the beginning of the third year, the student should select, in consultation with the Department, a special subject, on some aspect of which he will write his honors essay. Instruction in a special subject or subjects is offered by most members of the Department. A few examples of possible special subjects are: Chaucer's Eng-

land, Elizabethan England, Seventeenth Century France, Revolutionary France, the Weimar Republic, the Russian Revolution, the Age of Jackson, the Hudson's Bay Company, Franco-Chinese relations.

The honors essay will be written in the final year under the supervision of a member of the Department, with whom the candidate will confer regularly. The Department may require any candidate for Honors, in addition to submitting his essay, to pass an oral or written examination on the subject of the essay.

Every candidate for Honors in History must satisfy the Department of his ability in sight translation from French, German or Russian. In particular circumstances, with the approval of the Department, another language related to his studies may be substituted. Language examinations are conducted by the Department twice a year; they may be written by the candidate in his third or fourth year.

In the final year the student is required to write a comprehensive examination in one of the following fields: British Medieval; British Modern; British Empire and Commonwealth; Canadian; American; Medieval European; European, 1500-1789; European 1789 to the present; Russian and East European; East Asian; or African History.

A student should choose his courses with some attention to the comprehensive examination he wishes to write. *He may not choose for comprehensive examination the field that includes his special subject and honors essay.*

An undergraduate wishing to enter a program of Slavonic and Soviet Studies may register for honors in History. He should then choose his options in accordance with the pattern prescribed by the Interdepartmental Committee on Slavonic and East European Studies. On the satisfactory completion of the whole program, he qualifies to have the notation "Slavonic and Soviet Studies" added to his record.

### 43.11.2 / CONCENTRATION IN HISTORY

Any combination of History courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

The Department of History offers the following advice:

Students who select History as a principal subject of concentration are advised to take History 200 in their first year. However, students may, except when a prerequisite is specifically required, take any senior History course (those in the 300 range) in their second or third year without a previous course in History. Students in their third year should choose an advanced course (in the 400 range) only if they have taken at least two previous courses in History, though exceptions may be made in the case of students with special interest and an adequate background in other related disciplines. Advanced courses are provided for third-year students who wish some specialization within areas covered generally by senior courses.

## 43.12 / *Mathematics*

### 43.12.1 / HONORS IN MATHEMATICS

Students may elect to read for either a B.A. or a B.Sc. degree with Honors in Mathematics.

The honors B.A. program is as follows:

*First year*: Mathematics 206 and 271; English 200; one Arts option; one option; Physical Education.

*Second year*: Mathematics 306 and 360; two Arts options; one option.

*Third year*: Mathematics 424; Mathematics 309 or 421, or Statistics 455 or Computing Science 310 or 460; two senior Arts options; one senior option.

*Fourth year*: Mathematics 410 or 423 or 426 or 505 or 580; Mathematics 502; two Arts options; Option.

The usual first year calculus course for a general program student in Arts is Mathematics 201 or 207. However, a general program student may take Mathematics 206 provided he has the permission of the Department. If a student passes Mathematics 206 he may apply to the Department for admission to second year Honors. A student with a good record in Mathematics 201 or 207 may also apply to the Department for admission on the understanding that his record will be considered equivalent to Mathematics 206. If such a student is granted admission he must satisfy all the requirements of the honors program he has chosen.

A list of Mathematics courses, together with their descriptions, appears in § 184 of the Faculty of Science section of the Calendar.

Honors programs must be approved by the Department of Mathematics.

## 43.13 / *Music*

### 43.13.1 / CONCENTRATION IN MUSIC

Any combination of Music courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

A student must present three full hours per week or their equivalent to receive credit for a full course.

For the B.Mus. program see § 43.25, below.

## 43.14 / *Philosophy*

### 43.14.1 / HONORS AND COMBINED HONORS IN PHILOSOPHY

Degrees with Honors from this Department will fall into two groups:

(1) B.A. with Honors in Philosophy and approved minor subject.

(2) B.A. with Honors in Philosophy combined with another approved subject (e.g. Greek, German etc.)

Students are advised to consult the Department for information before choosing one of the groups, and in any case, Departmental approval of the final program of studies is required before registration. In the case of students taking combined honors, the program will be arranged in consultation with the other department concerned.

Honors in Philosophy will require a minimum of nine and a maximum of ten courses in Philosophy. Four in a minor subject, or an integrated selection of five or six in a group of subjects will also be required. Students will arrange their particular program in consultation with an adviser appointed by the Department.

The following schedule of Philosophy courses is required for Honors students:

(1) Philosophy 240 or 242, and/or Philosophy 250, normally in the first year.

(2) Philosophy 250 or 360 to be taken in either the first or second year.

(3) Philosophy 341 and 343 to be taken in the second year.

(4) Philosophy 345 and 347 to be taken in the third year.

(5) Philosophy 420 to be taken in the fourth year.

(6) At least one of Philosophy 440, 465, and 468.

(7) At least one of Philosophy 450, 452 and 454.

(8) Options—the equivalent of at least three full courses, at least one of which must be at the 400 level.

(9) There may be one further half or full course at either the 300 or 400 level.

Optional courses outside the fields of Philosophy and the minor will complete the program.

In the case of Combined Honors programs, Philosophy and the other subject will be given equal weight, and some room will be allowed for the optional courses in other fields. Items (1)-(5) of the above list will be required Philosophy courses.

### 43.14.2 / CONCENTRATION IN PHILOSOPHY

Any combination of Philosophy courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

Although no restrictions are placed upon the choice of Philosophy courses other than those imposed by prerequisite requirements and Faculty regulations, nevertheless the Department strongly recommends the following sequences for students taking Philosophy as an area of concentration:

*Three-course sequence*: Philosophy 240 and/or 250, and one or two options.

*Four-course sequence*: Philosophy 240 and/or 250, two of Philosophy 341-347, and one or two options.

*Five-course sequence*: Philosophy 240, 250, two of Philosophy 341 - 347, and two options.

## 43.15 / *Political Science*

### 43.15.1 / HONORS IN POLITICAL SCIENCE

*First year*: Political Science 200; English 200; a laboratory science; two options to be chosen in consultation with the Department; Physical Education.

*Second year*: Two courses in Political Science; three options to be chosen in consultation with the Department.

*Third and Fourth years*: Before entering the third year, each student will arrange, in consultation with the Department, a program of study and lectures to prepare himself for final comprehensive examinations. Unless they have been taken in the first and second years, two courses in languages other than

English, preferably French or German or Russian, are required. Students may take either two courses in one language or one in each of two languages.

Students wishing to undertake a program of Slavonic and Soviet studies may register for Honors in Political Science. By choosing his options according to the course requirements set out by an interdepartmental committee, a student may qualify to have the notation "Slavonic and Soviet Studies" added to his record upon satisfactory completion of his whole program.

### 43.15.2 / CONCENTRATION IN POLITICAL SCIENCE

Any combination of Political Science courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

For those students who seek a more thorough grounding in the principles of the subject, the Department of Political Science advises the following sequences:

*Three-course sequence*: Political Science 200 and two senior Political Science courses.

*Four-course sequence*: Political Science 200 and three senior Political Science courses.

*Five-course sequence*: Political Science 200, Political Science 315 and three other senior Political Science courses.

Students who elect a five-course sequence as a preparation for graduate studies in Political Science should consult the Department.

## 43.16 / *Psychology*

### 43.16.1 / HONORS IN PSYCHOLOGY

The Department offers both the B.A. and the B.Sc. degrees with Honors in Psychology. Students wishing to emphasize the humanities and social sciences in their program should register for the B.A.; those who wish to emphasize the physical and biological sciences should register for the B.Sc.

Honors in Psychology will require six to ten courses in Psychology including the following: Psychology 202 and 309 (prerequisite Mathematics 30 or 100); one Science course with laboratory; one Arts course; and an Honors Seminar (301, 401). An Honors Seminar must be taken each year that the student is in residence in the honors program at the University. A minimum of five courses will be taken in related subjects. The courses in related subjects might be all in one field (e.g. Mathematics or Biology) or in several, depending on the student's special interest and relevance of the courses to the subject matter of Psychology.

In addition a minimum of five optional courses will be chosen; some of these will be integrated with the program in Psychology while others must be general options.

An important feature of the Honors program is the opportunity for the student to engage in independent study and research. During the fourth year the student will write an Honors thesis under the guidance of a member of the Department.

### 43.16.2 / CONCENTRATION IN PSYCHOLOGY

Any combination of Psychology courses will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

The Department of Psychology offers courses leading to both the B.A. and B.Sc. degrees. Students wishing to emphasize the biological sciences in their program should register for the B.Sc., those wishing to emphasize the humanities and social sciences should register for the B.A. degree.

For those students who seek a more thorough grounding in the principles of the subject, the Department of Psychology advises the following sequences:

*Three-course sequence*: Psychology 202; Psychology 309; one half-course (with laboratory) listed in the Science section of the Calendar; one senior Psychology course listed in the Arts section of the Calendar.

*Four or five-course sequence*: As above, plus either one or two senior Psychology courses which may be chosen from the Calendar listings of either Faculty.

## 43.17 / *Religious Studies*

### 43.17.1 / CONCENTRATION IN RELIGIOUS STUDIES

Any combination of courses in Religious Studies will be accepted by the Faculty of Arts as a subject of concentration, provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

## 43.18 / *Romance Languages*

### 43.18.1 / HONORS IN ROMANCE LANGUAGES

Honors programs in Romance Languages provide two years of general culture and two years of specialized studies. A student may therefore enter Honors at the end of the first or second year of the general B.A. program, if he has the required standing and the necessary prerequisite.

Three types of programs are offered.

The first is designed for students wishing to concentrate on French or Spanish or Italian or Romance Linguistics, with a second Romance Language or Romance Linguistics as a minor, and consists of seven or eight courses in the major, three or four in the minor, and eight to ten approved options, for a total of twenty courses.

The second is designed for students wishing to acquire a broader base in the Romance field, and consists of six or seven courses in the major, four or five courses in the first minor, three in the second minor, and not fewer than six approved options, for a total of twenty courses.

The third is designed for students wishing to concentrate on French or Spanish or Italian or Romance Linguistics with an approved second subject (e.g. Russian or German or Latin or General Linguistics or History or Philosophy or Art or Music, etc.) and consists of eight courses in French or Spanish or Italian or Romance Linguistics and four courses in the second subject, and approved options to a total of twenty courses. In the third type of program only and at the discretion of the Department, a student may take up to eleven courses in his major subject.

All programs must include a Science course in the first year and, in subsequent years, such laboratory and practical hours as may be deemed necessary to improve the student's oral proficiency.

All courses are to be chosen in consultation with the Departmental head or chairman.

### 43.18.2 / COMBINED HONORS IN ROMANCE LANGUAGES

A degree with Honors in French or Spanish or Italian or Romance Linguistics and an approved second subject such as Latin, English, German, Russian or Ukrainian, will be awarded to students successfully completing a program of studies similar to the one outlined above, except that the number of senior courses will be as nearly as possible equal in each of the two languages.

All such programs must be approved by both the departments concerned.

### 43.18.3 / HONORS IN FRENCH

Honors in French may be obtained in accordance with the general regulations for honors in Romance Languages outlined above.

NOTE: In 1969-70, the structure of programs and the designation of courses in French will be modified.

### 43.18.4 / HONORS IN ITALIAN

Honors programs with Italian as the major subject and the Combined Honors program with Italian must include Romance Linguistics 200. They may also include Romance Linguistics 397. Students in these programs will take Honors laboratory and language seminar hours.

### 43.18.5 / HONORS IN SPANISH AND SPANISH-AMERICAN STUDIES

This program consists of ten full courses in the Spanish language and in Spanish and Spanish-American literature, required courses in Linguistics, History, Anthropology and Geography, and three free options (two of which may be in another language). Students in this program will also take the Honors laboratory and language seminar hours.

### 43.18.6 / CONCENTRATION IN FRENCH

Any combination of French courses will be accepted by the Faculty of Arts as a subject of concentration provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled. The Department of Romance Languages advises the following sequences:

(1) *For students beginning the language at the University*: French 100 in the first year; French 200 or 230 in the second; up to three of French 330, 340, 350, 360, 370, in the third year.

(2) *For students entering the University with matriculation French*: French 200 or 230 in the first year; one or two of French 330, 340, 350, 360, 370, in the second year; one or two of 340, 350, 360, 375, 380, 400, in the third year.

Neither French 330 nor 350 may be taken *after* any of the other senior courses.

French-speaking students and students beginning the B.A. with more than matriculation French should arrange with the Department, before registering, to take a placement test in order that they may start their sequence with the appropriate course.

### 43.18.7 / CONCENTRATION IN ITALIAN

Any combination of Italian courses will be accepted by the Faculty of Arts as a subject of concentration provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

The following sequences of courses are recommended to students choosing Italian as a subject of concentration:

*For students beginning the language at University*:

(1) Italian 100, 300, 320, in a three-course sequence;

(2) Italian 100, 300, 320, 330, in a four-course sequence;

(3) Italian 100, 300, 320, 330, and a senior Italian course in a five-course sequence.

*For Italian-speaking students*:

(1) Italian 200, 320, 330, in a three-course sequence;

(2) Italian 200, 320, 330, and a senior Italian course, in a four-course sequence;

(3) Italian 200, 320, 330, and two senior Italian courses, in a five-course sequence.

### 43.18.8 / CONCENTRATION IN SPANISH

Any combination of Spanish courses will be accepted by the Faculty of Arts as a subject of concentration provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled. The Department of Romance Languages advises the following sequences:

(1) Spanish 100, 300 and 320 in a three-course sequence;

(2) Spanish 100, 300, 320 and 330 or 340, in a four-course sequence;

(3) Spanish 100, 300, 320 and two of 330, 340, 360, 370, in a five-course sequence.

## 43.19 / *Slavonic Languages*

### 43.19.1 / HONORS IN SLAVONIC LANGUAGES

The Honors Program of the Department of Slavonic Languages is designed primarily to provide a sound knowledge of Russian or Ukrainian and other Slavonic languages and literatures in preparation for advanced study toward higher degrees and a professional or academic career.

The Department also offers:

(1) a program of study in Modern Slavonic Philology and Linguistics, with particular emphasis on either Russian or Ukrainian language, literature, and linguistics;

(2) a combined Honors program involving, for example, study of Russian and English, Russian and French, Russian and Latin, etc.;

(3) a special program of studies of Central and Eastern Europe and Soviet Asia (see [d] below) in conjunction with the Departments of Economics, Geography, History and Political Science.

Degrees with Honors from this Department fall into these groups:

(a) B.A. with Honors in Russian with an approved second subject such as English, French, German, History, Latin, Spanish, Ukrainian, etc.;

(b) B.A. with Honors in Modern Slavonic Philology and Linguistics;

(c) B.A. in the combined Honors program;

(d) B.A. with Honors in Slavonic and Soviet Studies with Russian language and literature serving as the core.

Programs in group (a) will require a maximum of eight courses in the major, four to six in the second subject, and six to eight approved options (one of which must be a Science course in the first year), for a total of twenty courses. Programs in this group will be arranged in consultation with the departments concerned.

Programs in group (b) with major in either Russian or Ukrainian will require five courses in the language and literature of the major (East Slavonic), one or two in Polish (West Slavonic), one in Serbocroatian (South Slavonic), Departmental Seminar in Modern Slavonic Philology and Linguistics 650, English 200 and one Science course in the first year, one Russian history course, General Linguistics 350, Slavonics 540 or 550, Russian or Ukrainian 420, Comparative Slavonic Literature 620, and four or five approved options for a total of twenty courses.

Programs in group (c) will require that the number of senior courses in each subject be as nearly as possible equal and selected in accordance with departmental requirements.

Programs in group (d) will require seven courses in Russian, two or three courses in a second Slavonic language, Contrastive Slavonic Linguistics 540, the Seminar in Slavonic Linguistics 550, one Science course in the first year, four approved options, and four or five courses approved by an interdepartmental committee, in History, Economics or Political Science related to the Slavic area for a total of twenty courses and one seminar.

All Honors students will take, in each year, such laboratory hours as may be deemed necessary to improve their oral proficiency.

### 43.19.2 / CONCENTRATION IN RUSSIAN

Any combination of Russian courses will be accepted by the Faculty of Arts as a subject of concentration provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled. The Department of Slavonic Languages advises the following sequences:

(1) Russian 100, 300 and 360, in a three-course sequence;

(2) Russian 100, 300, 360, and one of 320, 380 or 400, in a four-course sequence;

(3) Russian 100, 300 and 360 and one of 320, 380, 390, 400, 420, 460 and in a five-course sequence.

### 43.19.3 / CONCENTRATION IN UKRAINIAN

Any combination of Ukrainian courses will be accepted by the Faculty of Arts as a subject of concentration provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled. The Department of Slavonic Languages advises the following sequences:

(1) Ukrainian 100, 300, and 360 in a three-course sequence;

(2) Ukrainian 100, 300, 360, and 400, or 460, or 200, 330, 360, and 400 or 460 in a four-course sequence.

## 43.20 / *Sociology*

### 43.20.1 / HONORS IN SOCIOLOGY

Degrees with Honors in Sociology will fall into two groups:

(1) B.A. with Honors in Sociology and an approved minor subject;

(2) B.A. with Honors in Sociology and Psychology.

There are several possible programs within each of these groups, and more detailed information is available from the Department. Students are advised to consult the Department for information before choosing one of the groups, and, in any case, Departmental approval of the final program of studies is required before registration. In the case of students under (2), the program will be arranged in consultation with the Department of Psychology.

Honors in Sociology will require eight to ten courses in Sociology. Depending on the special interests of the students five or six courses in a related minor subject will be taken. An additional five or six courses outside the field of Sociology and the minor area will be required to complete the program.

Honors in Sociology and Psychology will require seven courses in Sociology and seven in Psychology. In addition, six other courses will be required to complete the program.

Students in the honors programs are required to take a foreign language or a year's course in statistics during the early part of the program.

In addition to final examinations in courses prescribed, students in the final year of each group will be required to write two comprehensive examinations, one of which may take the form of an essay paper.

### 43.20.2 / CONCENTRATION IN SOCIOLOGY

Any combination of Sociology courses will be accepted by the Faculty of Arts as a subject of concentration provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

For those students who seek a more thorough grounding in the principles of the subject, the Department of Sociology advises the following sequences:

*Three-course sequence*: Sociology 202 and two senior Sociology courses;

*Four-course sequence*: Sociology 202 and three senior Sociology courses (including one 400 level course);

*Five-course sequence*: Sociology 202 and four senior Sociology courses (including one 400 level course).

Students interested in proceeding to graduate work in Sociology should take Sociology 311 and 432, and are encouraged to consult with the Department early in their university career.

## 43.21 / *Combined Program for the Degrees of B.A., LL.B.*

A five-year program leading to the degrees of B.A., LL.B. is offered co-operatively by the Faculties of Arts and Law. The first two years of the program are administered by an Inter-Faculty Committee under the chairmanship of Dr. F. D. Blackley, Professor of History and Associate Dean of the Faculty of Arts.

### 43.18.7 / CONCENTRATION IN ITALIAN

Any combination of Italian courses will be accepted by the Faculty of Arts as a subject of concentration provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

The following sequences of courses are recommended to students choosing Italian as a subject of concentration:

*For students beginning the language at University*:

(1) Italian 100, 300, 320, in a three-course sequence;

(2) Italian 100, 300, 320, 330, in a four-course sequence;

(3) Italian 100, 300, 320, 330, and a senior Italian course in a five-course sequence.

*For Italian-speaking students*:

(1) Italian 200, 320, 330, in a three-course sequence;

(2) Italian 200, 320, 330, and a senior Italian course, in a four-course sequence;

(3) Italian 200, 320, 330, and two senior Italian courses, in a five-course sequence.

### 43.18.8 / CONCENTRATION IN SPANISH

Any combination of Spanish courses will be accepted by the Faculty of Arts as a subject of concentration provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled. The Department of Romance Languages advises the following sequences:

(1) Spanish 100, 300 and 320 in a three-course sequence;

(2) Spanish 100, 300, 320 and 330 or 340, in a four-course sequence;

(3) Spanish 100, 300, 320 and two of 330, 340, 360, 370, in a five-course sequence.

## 43.19 / *Slavonic Languages*

### 43.19.1 / HONORS IN SLAVONIC LANGUAGES

The Honors Program of the Department of Slavonic Languages is designed primarily to provide a sound knowledge of Russian or Ukrainian and other Slavonic languages and literatures in preparation for advanced study toward higher degrees and a professional or academic career.

The Department also offers:

(1) a program of study in Modern Slavonic Philology and Linguistics, with particular emphasis on either Russian or Ukrainian language, literature, and linguistics;

(2) a combined Honors program involving, for example, study of Russian and English, Russian and French, Russian and Latin, etc.;

(3) a special program of studies of Central and Eastern Europe and Soviet Asia (see [d] below) in conjunction with the Departments of Economics, Geography, History and Political Science.

Degrees with Honors from this Department fall into these groups:

(a) B.A. with Honors in Russian with an approved second subject such as English, French, German, History, Latin, Spanish, Ukrainian, etc.;

(b) B.A. with Honors in Modern Slavonic Philology and Linguistics;

(c) B.A. in the combined Honors program;

(d) B.A. with Honors in Slavonic and Soviet Studies with Russian language and literature serving as the core.

Programs in group (a) will require a maximum of eight courses in the major, four to six in the second subject, and six to eight approved options (one of which must be a Science course in the first year), for a total of twenty courses. Programs in this group will be arranged in consultation with the departments concerned.

Programs in group (b) with major in either Russian or Ukrainian will require five courses in the language and literature of the major (East Slavonic), one or two in Polish (West Slavonic), one in Serbocroatian (South Slavonic), Departmental Seminar in Modern Slavonic Philology and Linguistics 650, English 200 and one Science course in the first year, one Russian history course, General Linguistics 350, Slavonics 540 or 550, Russian or Ukrainian 420, Comparative Slavonic Literature 620, and four or five approved options for a total of twenty courses.

Programs in group (c) will require that the number of senior courses in each subject be as nearly as possible equal and selected in accordance with departmental requirements.

Programs in group (d) will require seven courses in Russian, two or three courses in a second Slavonic language, Contrastive Slavonic Linguistics 540, the Seminar in Slavonic Linguistics 550, one Science course in the first year, four approved options, and four or five courses approved by an interdepartmental committee, in History, Economics or Political Science related to the Slavic area for a total of twenty courses and one seminar.

All Honors students will take, in each year, such laboratory hours as may be deemed necessary to improve their oral proficiency.

### 43.19.2 / CONCENTRATION IN RUSSIAN

Any combination of Russian courses will be accepted by the Faculty of Arts as a subject of concentration provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled. The Department of Slavonic Languages advises the following sequences:

(1) Russian 100, 300 and 360, in a three-course sequence;

(2) Russian 100, 300, 360, and one of 320, 380 or 400, in a four-course sequence;

(3) Russian 100, 300 and 360 and one of 320, 380, 390, 400, 420, 460 and in a five-course sequence.

### 43.19.3 / CONCENTRATION IN UKRAINIAN

Any combination of Ukrainian courses will be accepted by the Faculty of Arts as a subject of concentration provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled. The Department of Slavonic Languages advises the following sequences:

(1) Ukrainian 100, 300, and 360 in a three-course sequence;

(2) Ukrainian 100, 300, 360, and 400, or 460, or 200, 330, 360, and 400 or 460 in a four-course sequence.

## 43.20 / *Sociology*

### 43.20.1 / HONORS IN SOCIOLOGY

Degrees with Honors in Sociology will fall into two groups:

(1) B.A. with Honors in Sociology and an approved minor subject;

(2) B.A. with Honors in Sociology and Psychology.

There are several possible programs within each of these groups, and more detailed information is available from the Department. Students are advised to consult the Department for information before choosing one of the groups, and, in any case, Departmental approval of the final program of studies is required before registration. In the case of students under (2), the program will be arranged in consultation with the Department of Psychology.

Honors in Sociology will require eight to ten courses in Sociology. Depending on the special interests of the students five or six courses in a related minor subject will be taken. An additional five or six courses outside the field of Sociology and the minor area will be required to complete the program.

Honors in Sociology and Psychology will require seven courses in Sociology and seven in Psychology. In addition, six other courses will be required to complete the program.

Students in the honors programs are required to take a foreign language or a year's course in statistics during the early part of the program.

In addition to final examinations in courses prescribed, students in the final year of each group will be required to write two comprehensive examinations, one of which may take the form of an essay paper.

### 43.20.2 / CONCENTRATION IN SOCIOLOGY

Any combination of Sociology courses will be accepted by the Faculty of Arts as a subject of concentration provided that the requirement for a minimum of three full courses is met, and the maximum not exceeded, and that prerequisite requirements are fulfilled.

For those students who seek a more thorough grounding in the principles of the subject, the Department of Sociology advises the following sequences:

*Three-course sequence*: Sociology 202 and two senior Sociology courses;

*Four-course sequence*: Sociology 202 and three senior Sociology courses (including one 400 level course);

*Five-course sequence*: Sociology 202 and four senior Sociology courses (including one 400 level course).

Students interested in proceeding to graduate work in Sociology should take Sociology 311 and 432, and are encouraged to consult with the Department early in their university career.

## 43.21 / *Combined Program for the Degrees of B.A., LL.B.*

A five-year program leading to the degrees of B.A., LL.B. is offered co-operatively by the Faculties of Arts and Law. The first two years of the program are administered by an Inter-Faculty Committee under the chairmanship of Dr. F. D. Blackley, Professor of History and Associate Dean of the Faculty of Arts.

In the first two years of the program, students register in the Faculty of Arts; in the remainder of the program, in the Faculty of Law.

The outline of the program is as follows:

*First year*: English 200; French 200 or 205, or German 200, or Latin 200; a Science or Mathematics or Statistics course; two of Economics 200, History 200, Philosophy 240, or Political Science 200; Physical Education.

*Second year*: Five approved Arts courses, subject to the regulations in ¶¶ (2), (3), and (4) below.

*Third year*: The prescription for first-year Law; one senior Arts course.

*Fourth year*: The prescription for second-year Law.

*Fifth year*: The prescription for third-year Law.

The program is subject to the following regulations:

(1) Matriculation requirements are the same as for the B.A. program, but with an average of at least 65 per cent required. See § 13.3 of the University Regulations section of the Calendar.

(2) The courses of the first two years of the program must include a major concentration of three courses in one of Economics, English, History, Philosophy, or Political Science, and a minor concentration of two courses in a second subject, not necessarily one of these.

(3) The program must include at least one approved course in either Canadian History or Canadian Government, and at least one approved course in British Constitutional History or British Government; these courses may, but need not, be included in either the major or the minor concentration.

(4) All Arts options require the approval of the Chairman of the Inter-Faculty B.A., LL.B. Committee.

(5) To be promoted from the first to the second year, a student must have successfully completed all courses in the first year with a grade-point average of at least 5.0.

(6) To be promoted from the second to the third year, a student must have successfully completed all courses in the second year with a grade-point average of at least 5.0 and must have attained a grade of 6 or better in at least four courses, two of which must be in the second year.

(7) The degree of B.A. may be awarded at the end of the fourth year.

## 43.22 / *The B.A. after a Previous Degree*

*Requirements for B.A. after B.Ed.* Holders of the B.Ed. degree, whose programs include thirteen Arts and Science courses, may qualify for the B.A. degree by completing a six-course program as prescribed by the Faculty of Arts. Those with fewer than thirteen Arts and Science courses will be required to take additional courses.

*Requirements for B.A. after B.Sc.* Students who have qualified for the degree of B.Sc. may proceed to the degree of B.A. by completing a nine-course program as prescribed by the Faculty of Arts.

*Requirements for B.A. after B.Com.* Holders of the B.Com. degree whose program includes at least ten Arts and Science courses may qualify for the B.A. degree by completing a ten-course program as prescribed by the Faculty of Arts. Those with fewer than ten Arts and Science courses will be required to take additional courses.

## 43.23 / *The Degree of B.F.A. in Art*

The Department of Art offers a program in Design and Art leading to the degree of Bachelor of Fine Arts. The program is as follows:

*First year*: Art 200, 231, and 233; English 200; a language other than English; Physical Education.

*Second year*: Art 301 or 302 or 401 or 402; Art 335; three courses from (i) Art 315 or 325, (ii) Art 365 or 375, and (iii) Art 385 or 395; Philosophy 350; an Arts or Science option.

*Third year*—ROUTE I: Art 301 or 302 or 401 or 402; the equivalent of two full courses chosen from Art 315, 325, 365, 375, 385, 395, 412, 422 and 462; Art 440; an Arts or Science option. ROUTE II (*available in 1968-69 session only*): Art 301 or 302 or 401 or 402; the equivalent of two and a half courses chosen from Art 315, 325, 365, 375, 385, 395, 412, 422, and 462; Art 335; an Arts or Science option.

*Fourth year*: The equivalent of two full courses chosen from among Art 315, 325, 365, 375, 385, 395, 412, 422, 462, 512 or 522, 562; Art 474; Art 500; a senior Arts or Science option.

The program is subject to the following regulations:

(1) Admission requirements are as set out in §§ 13.1 and 13.3.1 of the University Regulations section of the Calendar.

(2) To be granted the B.F.A. degree, a student must present a grade of 4 or better in each course, and a grade-point average of at least 5.0 in all courses credited towards the degree after the first year. One grade of 3 may be accepted, provided it is not in the central subject of the program.

## 43.24 / *The Degree of B.F.A. in Drama*

The Department of Drama offers a program leading to the degree of Bachelor of Fine Arts. After a common first year, students are required to specialize in one of Acting, Directing, or Design. Courses in the program are listed below.

The program is subject to the following regulations:

(1) Admission requirements are as set out in §§ 13.1 and 13.3.1 of the University Regulations section of the Calendar.

(2) To be awarded the B.F.A. degree, a student must obtain a grade of 4 or better in each course, and a grade-point average of at least 5.0 in all courses credited towards the degree after the first year. One grade of 3 may be accepted, provided it is not in the area of concentration of the program.

(3) A student must complete at least two academic years of the program, including the first year, at The University of Alberta.

### 43.24.2 / COMMON FIRST YEAR

Drama 200, 240, 250, 270, and 271; English 200; Fitness Activities including Fencing.

### 43.24.3 / SPECIALIZATION IN ACTING

*Second year*: Drama 300, 330, 340, 350, 351, 380, 392, and 394; an approved Arts or Science option.

*Third year*: Drama 400, 430, 440, 450, 492; English 332; an approved Drama or Arts or Science option.

*Fourth year*: Drama 530, 540, 551, 592, 595; an approved Drama option; Philosophy 350 or a Music or Art option; a senior Arts or Science option.

### 43.24.4 / SPECIALIZATION IN DESIGN

*Second year*: Drama 300, 370, 373, 374, 394; Art 240; an approved Arts or Science option.

*Third year*: Drama 380, 381, 400, 470, 472, 473, and 493; Art 310; an approved option.

*Fourth year*: Drama 480, 570, 593, and 595; a senior Drama option (Drama 500 is required for students entering the master's program in Drama); Philosophy 350.

### 43.24.5 / SPECIALIZATION IN DIRECTING

*Second year*: Drama 300, 350, 351, 380, 381, and 394; an approved modern language; a Drama or Arts or Science option.

*Third year*: Drama 370, 400, 480, 491; English 332; Philosophy 350; an approved Arts or Science option.

*Fourth year*: Drama 360, 470, 580, 591, 595; an approved Music course; a senior Drama or Arts or Science option (Drama 500 is required for those entering the master's program in Drama).

## 43.25 / *The Degree of B.Mus.*

### 43.25.1 / GENERAL INFORMATION

The Department of Music offers a variety of four-year programs leading to the degree of Bachelor of Music. Candidates for the B.Mus. degree may choose one of three areas of study: (1) Theory and Composition; (2) Applied Music (piano, orchestral instrument, organ, or voice); (3) Music History and Literature. The course requirements for each of these programs are set out below.

The programs are subject to the following regulations:

(1) Admission requirements are as set out in §§ 13.1 and 13.3.2 of the University Regulations section of the Calendar.

(2) To be granted the B.Mus. degree, a student must present a grade of 4 or better in all of the courses required in the program and a grade-point average of at least 5.0 in all courses credited towards the degree after the first year. One grade of 3 may be accepted provided that it is not in the central subject of the program.

(3) Each candidate must complete a course in one of Latin, Italian, French, German, or Russian as one of his options.

(4) Options must be approved by the Department, and must include at least one senior course.

(5) Each candidate must choose a Second Practical Subject in consultation with the head of the Department.

(6) A candidate who chooses an Orchestral Instrument or Voice as his First Practical Subject must choose Piano as his Second Practical Subject.

(7) A candidate in Theory and Composition must achieve the standard of Grades VII and X of the Western Board of Music in his Second and First Practical Subjects respectively by the end of his third year of study.

(8) A candidate in Applied Music or Music History and Literature must achieve the standard of Grades VII and XI of the Western Board of Music in his Second and First Practical Subjects respectively for Teachers, and Grades VII and XII for Performers, by the end of his fourth year of study.

(9) A candidate in Orchestral Instruments may choose to study any one of the following as his First Practical Subject: violin, viola, 'cello, double bass; flute, oboe, clarinet, saxophone, bassoon; trumpet, French horn, trombone, tuba, harp; percussion.

(10) A candidate in Applied Music will be required to present a junior and a senior recital before graduation.

### 43.25.2 / PROGRAM IN THEORY AND COMPOSITION

*First year*: English 200; Music 213, 215, 225, 250, and 260; Physical Education.

*Second year*: Music 302, 304, 312, 315, 325, 350, 352, 360, and 361; an approved option.

*Third year*: Music 402, 404, 415, 425, 450, 452, 460, and 461; an approved option.

*Fourth year*: Music 552, 553, 554, 555, 560, and 561; an approved senior option; an approved option.

### 43.25.3 / PROGRAM IN APPLIED MUSIC

Candidates may specialize in one of Piano, Organ, Orchestral Instruments, or Voice.

*First year*: English 200; Music 202, 213, 215, 225, 229 and 250; Physical Education.

*Second year*: Music 302 312, 315, 325, 329, 350, 352, and 361; an approved option.

*Third year*: Music 402, 415, and 425; Music 427 (for Piano majors only); Music 428 (for Piano and Voice majors only); Music 429, 450, and 452; an approved option.

*Fourth year*: Music 461; Music 525; Music 527 (for Piano and Voice majors only); Music 529; an approved senior option; an approved option.

### 43.25.4 / PROGRAM IN MUSIC HISTORY AND LITERATURE

*First year*: English 200; Music 202, 213, 215 225, 250; Physical Education.

*Second year*: Music 302, 304, 312, 315, 325, 350, 352, and 361; an approved option.

*Third year*: Music 402, 404, 415, 425, 450, 452, and 461; an approved option.

*Fourth year*: Music 525, 555, 561; an approved Music option; an approved senior option; an approved option.

## 43.26 / *Pre-Professional Programs for Medicine and Dentistry*

Admission to the Faculties of Medicine and Dentistry is contingent upon the successful completion of two years of university study and the presentation of full university courses in Organic Chemistry, Inorganic Chemistry, Physics, and Zoology. A student planning to enter one of these Faculties may register in a B.A. program in the Faculty of Arts. To meet the requirements, he should include in his program Chemistry 230 and 350, Physics 100 or 200 or 240, and Biology 230 or the equivalent. After successful completion of two years in the Faculty of Arts he may apply for admission to the Faculty of Dentistry or Medicine.

# 44 / DETAILS OF COURSES

## 44.1 / *General Information*

Courses open to students in the Faculty of Arts are listed here in alphabetical order, whether they are offered by the Faculty of Arts or by another faculty or school.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Courses numbered 100 to 199 are introductory, usually equivalent to high school courses. Those numbered 200 to 299 are junior courses, normally taken by first-year undergraduates. Those numbered 300 to 499 are senior courses, normally taken after the first year. Courses numbered 500 and up are normally restricted to honors and graduate students.

Following the title of the course is the symbol "♦", standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages. Some courses are offered for credit only, and carry no weight.

The next two figures, enclosed in paren-

theses, indicate the number of lecture hours and laboratory hours, respectively, required by the course in a week. When they appear, the symbol "s" denotes seminar hours, and the symbol "L" denotes combined lecture-laboratory hours. The hours of instruction for a full course are the same in both terms unless otherwise indicated. If the course is a half-course, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 44.2 / *Accounting*

Faculty of Business Administration and Commerce

NOTE: The following courses are open to Arts or Science students only if they are concentrating in Economics and have the permission of their Dean.

ACCTG 202. *Introductory Accounting.* ♦3 (either term, 3-2). Postulates and principles of accounting, the accounting cycles, capital and income measurement, financial statement preparation and analysis. Emphasis on reporting to shareholders, creditors, and other external decision makers.

ACCTG 204. *Managerial Information and Control Systems.* ♦3 (either term, 3-2). Corporate goals, planning and control concepts, cost accumulation for pricing purposes, and product costing.

## 44.3 / *Anthropology*

### 44.3.1 / JUNIOR COURSE

ANTHR 202. *Introductory Anthropology.* ♦6 (3-0). A survey of the field of Anthropology, including human paleontology, race, human prehistory, linguistics, and ethnology.

### 44.3.2 / SENIOR COURSES

ANTHRO 302. *Cultural Anthropology.* ♦6 (3-0). The nature of culture; its uniformities and varieties; comparative study of non-western cultures in terms of family, clan, political organization, economic systems, religion, art, folklore, and social customs; processes of cultural change.

ANTHRO 305. *Culture and Language.* See INTER D 305.

ANTHRO 325. *Anthropology and World Problems.* ♦6 (3-0). An anthropological approach to some of the major problems facing the world today: relationship between indigenous peoples and industrial states; emergent societies in tropical, agrarian, and formerly colonial areas. Prerequisite: An introductory course in Anthropology or Sociology.

ANTHRO 330. *Culture and Technology.* ♦3 (Second Term, 3-0). An anthropological introduction to the evolution of tools and techniques; the adaptation of society to environment through technology; and the social and ideological consequences of technological changes.

ANTHRO 350. *Indians of North America.* ♦6 (3-0). A survey of the cultural and linguistic areas of aboriginal North America; a comparative study of technology, social organization, economic systems, art, and languages. Some emphasis on the Indians of Canada and on problems of cultural change.

ANTHRO 360. *People and Cultures of Middle and South America.* ♦6 (3-0). The history, cultural development, and modern communities of the Indians of this region. The significance of Indian values and institutions in modern Latin America.

ANTHRO 371. *People and Cultures of Southeast Asia.* ♦3 (either term, 3-0). The major culture groups of Southeast Asia: Burma, Thailand, Malaya, Indonesia; origins and development, modern forms, trends of change. Prerequisite: A course in Anthropology or Sociology, or consent of the Department.

ANTHRO 372. *Peoples and Cultures of South Asia.* ♦3 (either term, 3-0). The major culture groups of South Asia: India, Pakistan and Ceylon; origins and development, modern forms, trends of change. Prerequisite: A course in Anthropology or Sociology, or consent of the Department.

ANTHRO 373. *Peoples and Cultures of the Middle East.* ♦6 (3-0). The major culture groups in the predominantly Islamic region extending from Morocco to Afghanistan; origins and development, modern forms, trends of change. Prerequisite: A course in Anthropology or Sociology, or consent of the Department.

ANTHRO 374. *Peoples and Cultures of East Asia.* ♦3 (either term, 3-0). The major culture groups of East Asia: China, Japan, Korea; origins and development, modern forms, trends of change. Prerequisite: A course in Anthropology or Sociology, or consent of the Department.

ANTHRO 375. *Peoples and Cultures of Africa.* ♦6 (3-0). The native cultures, especially of the Sub-Saharan part of the continent. Emphasis on present-day trends of change. Prerequisite: A course in Anthropology or Sociology, or consent of the Department.

ANTHRO 377. *The Negro in the New World* ♦6 (3-0). The history and life of the Negro in North America, South America, and the Caribbean from an anthropological perspective. Problems of African cultural survivals, family and community organization, race and class, the articulation of the Negro in present day New World societies.

ANTHRO 390. *Physical Anthropology.* ♦6 (3-3). Human origins, evolution and variation: primates, fossil man, races of *Homo sapiens*. Anthropometric and genetic approaches to the analysis of human differences. Laboratory analysis of human osteology. Prerequisite: Anthropology 202 or a course in Biology or Zoology, or consent of the Department. Note: This course is accepted as a Science course in B.A. Programs.

ANTHRO 395. *Prehistoric Archaeology.* See INTER D 395.

ANTHRO 402. *North American Archaeology.* ♦6 (3-0). The peopling of North America and prehistoric development of culture as revealed by archeological data. Prerequisite: Anthropology 202 or consent of the Department.

ANTHRO 413. *Social Structure.* ♦6 (3-0). The analysis of kinship systems, kin and residential groups, sodalities, and related aspects of social organization in the non-western world, with emphasis on

evolutionary and functional theories. Prerequisite: An introductory course in Anthropology or Sociology.

ANTHRO 414. *Comparative Political and Economic Systems.* ♦6 (3-0). The comparative study of power, its distribution and uses, social control, productive technologies, and exchange systems in primitive and peasant societies. Prerequisite: An area course in Anthropology.

ANTHRO 416. *Anthropology and Education.* See INTER D 416.

ANTHRO 420. *Anthropology of Religion.* ♦6 (3-0). Supernatural beliefs and practices in primitive and peasant cultures, including magic, shamanism, priesthoods, taboos, and folk-beliefs. Evolutionary, historical, and functional theories of religion. Prerequisite: A course in Anthropology or Sociology, or consent of the Department.

ANTHR 425. *Creative Expression among Non-Literate Peoples.* ♦6 (3-0). Anthropological theory and method as applied to mythology, folklore, humor, and the arts among non-literate peoples of the world. Prerequisite: A course in Anthropology or Sociology, or consent of the Department.

ANTHR 440. *Culture and Personality.* ♦6 (3-0). The role of culture in personality formation; socialization practices and formation of adult character in non-western cultures. Prerequisite: A course in Anthropology, Sociology, or Psychology, or consent of the Department.

ANTHR 445. *North American Cultural Character.* ♦6 (3-0). An analysis of cultural values as they relate to character and behavior of North Americans, stressing the present day but tracing the evolution of value-systems from the seventeenth century. Similarities and differences between Canada and the United States. Prerequisites: Three or more courses in one of: Anthropology, Economics, History, Philosophy, Psychology, or Sociology.

ANTHR 470. *American Indian Linguistics.* See INTER D 470.

ANTHR 480. *Method and Theory in Prehistoric Archaeology.* ♦6 (First Term, 3-3; Second Term, 3-0). A comprehensive survey of the methods and techniques used in prehistoric archaeology, including auxiliary sciences; conceptual approaches and models used for interpreting archaeological data and cultural history; the relation of explanatory theory in cultural history to anthropology as a whole. Prerequisite: Anthropology 202 or consent of the Department.

ANTHR 495. *Field Methods in Archaeology.* ♦6 (3-3). The application of archaeological theory and methods to field problems. Prerequisite: A previous course in Anthropology or consent of the Department.

### 44.3.3 / HONORS AND GRADUATE COURSES

ANTHR 500. *Proseminar in Anthropology.* ♦6 (3-0). Recent and current research problems in sociocultural, archeological, physical, and linguistic Anthropology. Open to fourth-year Honors students in Anthropology with consent of the Department.

ANTHR 503. *The Anthropology of Conflict.* ♦6 (3-0). Seminar in cross-cultural research. Note: Restricted to graduate and Honors students in Anthropology and Sociology except with consent of the Department.

ANTHR 504. *Methods in Ethnology and Social Anthropology.* ♦6 (3-3). Note: Restricted to graduate students and fourth-year Honors students in Anthropology except with consent of the Department.

ANTHR 505. *Field Methods in Ethnology and Social Anthropology.* ♦6 (3-0). Note: Restricted to graduate students and fourth-year Honors students in Anthropology except with consent of the Department.

ANTHR 510. *Theory of Culture.* ♦6 (3-0). Past and current thought concerning the nature of culture and cultural change, and such concepts as cultural evolution, diffusion, invention, acculturation, patterns, and themes. Relation of theory to problems of planned culture change in underdeveloped areas. Note: Open to fourth year Honors or graduate students in Anthropology, or to others with consent of the Department.

ANTHR 515. *Seminar: The Transmission of Culture.* ♦6 (3-0). Note: Restricted to graduate students in Anthropology, Sociology, or Education, except with consent of the Department.

ANTHR 525. *Seminar: Problems in the Anthropology of Arts.* ♦6 (2-0). Note: Restricted to graduate students in Anthropology, Sociology, or Fine Arts.

ANTHR. 530. *Comparative Agrarian Societies.* ♦6 (3-0). Note: Restricted to graduate students in Anthropology, Sociology, and Political Science, except with consent of the Department.

ANTHR 535. *Anthropology and the Nation-State.* Restricted to graduate students in Anthropology, Sociology, Political Science, or Economics, who have credit in an area course in Anthropology or Political Science, or Sociology 350, or Economics 410.

ANTHR 540. *Conference Course in Regional Ethnology.* ♦6 (3-0).

ANTHR 541. *Conference Course in Regional Archaeology.* ♦6 (3-0).

ANTHR 542. *Individual Research.* ♦6 (3-0).

ANTHR 590. *Advanced Physical Anthropology.* ♦6 (3-3). Prerequisite: Anthropology 390 or consent of the Department.

ANTHR 595. *Seminar in Archaeology.* ♦6 (3-3).

ANTHR 596. *Field Methods in Archaeology.* ♦6 (3s-3).

## 44.4 / *Art*

### 44.4.1 / JUNIOR COURSES

ART 200. *Introduction to the History of Art.* ♦6 (3-0). Fundamental concepts underlying painting and the plastic arts; the major styles and contributions of each important period.

ART 231. *Fundamentals of Visual Communication I.* ♦6 (2-4). A studio-based course concerned with the analysis of information expressed visually in two and three dimensions, and with illusion implied by line and color.

ART 233. *Fundamentals of Visual Communication II.* ♦6 (2-4). Additional study of the principles of visual communication in the context of design; introduction to theory and methodology of design. Note: Restricted to B.F.A. students only.

### 44.4.2 / SENIOR COURSES

ART 301. *History of European Art, from the Third to the Thirteenth Century A.D.* ♦6 (3-0). Early Christian, Byzantine, and Medieval art of Europe.

ART 302. *History of European Art, from the Twelfth to the Sixteenth Century A.D.* ♦6 (3-0). The art of the Renaissance.

ART 315. *Fundamentals of Painting.* ♦3 (either term, 2-4). The application of principles of visual communication in the context of painting, including a survey of materials and techniques. Prerequisite: Art 231, and consent of the Department. Corequisite: Art 335.

ART 325. *Fundamentals of Printmaking.* ♦3 (either term, 2-4). The application of principles of visual communication in the context of printmaking, including a survey of the tools, techniques, and materials available. Prerequisite: Art 231 and consent of the Department. Corequisite: Art 335.

ART 335. *Visual Communication I.* ♦3 (either term, 2-4). Further study in depth of elements of visual communication and their possible use. Prerequisite: Art 231. This course may only be taken as a corequisite for Art 315, 325, 365, 375, 385, or 395.

ART 365. *Fundamentals of Sculpture.* ♦3 (either term, 2-4). The application of principles of visual communication in the context of sculpture, including a survey of tools, techniques, and materials available. Prerequisite: Art 231 and consent of the Department. Corequisite: Art 335.

ART 375. *Fundamentals of Industrial Design.* ♦3 (either term, 2-4). The application of the principles of visual communication in the context of industrial design, including a survey of tools, techniques, and materials available. Prerequisite: Art 231 and consent of the Department. Corequisite: Art 335.

ART 385. *Fundamentals of Typographic Design.* ♦3 (either term, 2-4). The application of the principles of visual communication in the context of typography, including a survey of tools, techniques, and materials available. Prerequisite: Art 231 and consent of the Department. Corequisite: Art 335.

ART 395. *Fundamentals of Photographic Design.* ♦3 (either term, 2-4). The application of the principles of visual communication in the context of photography, including a survey of tools, techniques, and materials available. Prerequisite: Art 231 and consent of the Department. Corequisite: Art 335.

ART 401. *History of Twentieth-Century Art.* ♦6 (3-0). Painting, sculpture, and architecture from the mid-nineteenth century to the present.

ART 402. *History of European Art: The Seventeenth Century.* ♦6 (3-0). The French, Flemish, Dutch, Spanish, German, and English schools from c. 1550 to c. 1720.

ART 412. *Advanced Painting I.* ♦6 (2-4). Prerequisite: Art 325 and consent of the Department. (Corequisite: Art 425, waived in 1968-69).

ART 422. *Advanced Printmaking I.* ♦6 (2-4). Prerequisite: Art 325 and consent of the Department. (Corequisite: Art 425, waived in 1968-69.)

ART 440. *Advanced Drawing II.* ♦6 (2-4). Prerequisite: Art 340. Note: Art 340 not offered, 1968-69; Art 440 not offered, 1969-70.

ART 462. *Advanced Sculpture I.* ♦6 (2-4). Prerequisite: Art 365 and consent of the Department. (Corequisite: Art 435, waived in 1968-69).

ART 474. *Advanced Drawing III.* ♦6 (3-3). Prerequisite: Art 440.

ART 500. *Seminar in the History of Art and Design.* ♦3 (3-0). Topics derived from the art and design of the present day. Note: Restricted to fourth year B.F.A. students.

ART 512. *Advanced Painting II.* ♦6 (2-4). Current concepts in art and design and the techniques and procedures currently available; the development, demonstration, and justification of individual aesthetic positions in relation to painting. Prerequisite: Art 412 and consent of the Department.

ART 522. *Advanced Printmaking II.* ♦6 (2-4). Current concepts in art and design and the techniques and procedures currently available; the development, demonstration, and justification of individual aesthetic positions in relation to printmaking. Prerequisite: Art 422 and consent of the Department.

ART 562. *Advanced Sculpture II.* ♦6 (2-4). Current concepts in art and design and the techniques and procedures currently available; the development, demonstration, and justification of individual aesthetic positions in relation to sculpture. Prerequisite: Art 462 and consent of the Department.

NOTE: 44.5 not allocated.

## 44.6 / *Christian Theology*

St. Joseph's College

For a course in Christian Theology which will be accepted as an Arts option for Roman Catholic students, see § 246.3.3 of the General section of the Calendar.

## 44.7 / *Classics*

### 44.7.1 / JUNIOR COURSE

CLASS 240. *Greek Mythology and Religion.* ♦6 (3-0). A survey from the Minoan-Mycenaean origins to the Hellenistic period with some reference to the Romans. Readings in translation from various ancient authors as well as from modern scholarly works.

### 44.7.2 / SENIOR COURSES

CLASS 350. *Classics in English (Greek). Greek Literature and Life.* ♦6 (3-0). An historical study of Greek literature in translation from Homer to the end of the ancient world. Examination of its social, artistic, and cultural background. Illustrations from the Department's collection of slides, films, photographs, and reproductions.

CLASS 351. *Classics in English (Latin).* ♦6 (3-0). The civilization of ancient Rome as seen through its own literature. Plays, poetry, letters, and speeches, read in English translation, and supplemented by slides.

CLASS 352. *History of Ancient Greece: The Influence of the Greek Genius on the Western World.* ♦6. (3-0). The Hellenic world from its beginnings in the Minoan-Mycenaean civilizations of Crete and Greece until the time of Alexander the Great, with special attention to the political organization of the city-state and the beginnings of democracy, and to cultural and economic development.

CLASS 353. *Roman History: The Roman Genius in the Mediterranean World.* ♦6 (3-0). The Roman Republic and its expansion from city-state to empire, with particular attention to the Roman methods of organization, law and government, and to the way in which the Romans impressed their culture on the Mediterranean world and on Western Europe.

CLASS 354. *History of Ancient Art.* ♦6 (3-0). The rise and progress of art from the Cretan period through the Graeco-Roman age. The aims and principles underlying ancient art. Illustrations from the Department's collection of slides and photographs.

CLASS 356. *Early Civilization.* ♦6 (3-0). A survey of the beginnings and development of civilization in the Mediterranean and Near Eastern areas, with particular attention to Ancient Egypt, the Fertile Crescent, the Assyrian and Persian Empires, the Phoenicians and Hebrews, the Hittites, Troy, Crete and prehistoric Greece.

CLASS 358. *History of the Roman Empire.* ♦6 (3-0). The Roman Empire and its rule over the Mediterranean world, with particular attention to imperial government, law, and civilization; to the decline and fall; and to the influence on Byzantine and Western European culture.

CLASS 395. *Prehistoric Archaeology.* See INTER D 395.

CLASS 459. *Roman Archaeology and Civilization.* ♦6 (5-15). A study of the old city of Rome, with lecturing trips to Etruria, Ostia, Terracina, Palestrina, Tivoli, Pompeii, Herculaneum, Cumae, and the Greek temples of Paestum. Designed to provide a richer understanding of Latin literature and Roman history and an introduction to advanced studies in Latin literature and Roman history and archaeology. Prerequisite: One 300-level course in Latin or History or Ancient History. Note: This course is given in Rome during the Summer Session only. Those interested may obtain a brochure from the Department of Classics giving further information.

### 44.7.3 / ADVANCED COURSES

The following courses are designed for third-year, honors, and graduate students. Normally they are conducted as seminars and the precise topics covered in any given course may vary from year to year. Some account, therefore, may be taken of the particular interests of students within the framework of the course. Normally students who take these courses are expected to have at least one previous course in Ancient History; if they do not, they must obtain the consent of the Department to their registration, and the Department will consider their special needs.

CLASS 461. *Topics in Roman Imperial History.* ♦6 (3-0). Studies and readings in the development of the nature of Imperial civilization, with particular attention to political and institutional changes and the nature of intellectual and cultural developments.

CLASS 462. *Topics in Roman Republican History* ♦6 (3-0). Studies and readings in the history of the Roman Republic. Emphasis on such topics as Early Rome, the Struggle of the Orders, the Punic Wars, Rome and the Greek East, the Civil Wars, the Decline of the Republic.

CLASS 465. *Topics in Hellenistic History.* ♦6 (3-0). Studies and readings in the development of the Hellenistic period from Alexander to the Roman conquest, with particular attention to Hellenistic political and economic developments, diplomatic relationships and the nature of the Hellenistic city-state and kingdom, as well as intellectual and cultural aspects of Hellenistic life.

CLASS 466. *Topics in Early Greek History.* ♦6 (3-0). Studies and reading in Greek History from earliest times to the beginning of the classical period. Emphasis on such topics as the Bronze Age, the Archaic Period.

CLASS 467. *Topics in Classical Greek History.* ♦6 (3-0). Studies and readings in Greek History from the beginning of the Classical period to the death of Alexander. Emphasis on such topics as the Pentekontaetia, the Peloponnesian Wars, the Spartan Hegemony, Thebes, the Rise of Philip, etc.

## 44.8 / *Comparative Literature*

Departments of Classics, English, Germanic Languages and General Linguistics, Romance Languages, and Slavonic Languages and Literatures.

### 44.8.1 / HONORS AND GRADUATE COURSES

NOTE: Before registering for these courses, students must consult the Interdepartmental Committee on Comparative Literature Studies, through one of the departments represented, to ensure that they are qualified to undertake the work.

C LIT 505. *The Theory of the Study of Literature.* ♦6 (3-0).

C LIT 507. *Literary Stylistics.* ♦6 (3-0). A comparative study of the schools and trends of contemporary literary stylistics (psychological, aesthetic, linguistic, quantitative stylistics) together with an analysis of specific stylistic devices on the basis of literary texts.

C LIT 510. *Poetics: The Nature and Forms of Poetry* ♦6 (3-0). A systematic study of the structures of poetry at all levels of the expression and the content (metre, genre, diction, syntax, imagery, topoi, motifs, and specific subject matter) with particular attention to their development and use through the Western tradition, ancient and modern. Prerequisite: Evidence of a competent reading knowledge of one relevant language other than English.

C LIT 515. *Studies in Folklore.* ♦6 (3-0). Introduction to the study of folklore as the spoken or written traditions of a people, that is, the traditional aesthetic expressions, and to its principal forms (e.g. folksong, folktale, legend, proverb, riddle). Particular attention to the Russian, German, English, American, and French folklore and to the importance of oral traditions for written literature. Prerequisite: Evidence of competent reading knowledge of one relevant language other than English.

C LIT 517. *The Greek and Latin Tradition in European Literature.* ♦6 (3-0). Prerequisite: Some knowledge of Greek but more particularly of Latin, or consent of the Committee.

C LIT 520. *Comparative Studies in Medieval Literature.* ♦6 (3-0). Prerequisite: Competent reading knowledge of either Latin or French or the consent of the Committee.

C LIT 528. *Comparative studies in the Renaissance and Baroque Literature of Italy, Spain, and France.* ♦6 (3-0). Prerequisite: A reading knowledge of at least one relevant language, besides French.

C LIT 530. *Comparative Studies in European Drama of the Sixteenth and Seventeenth Centuries.* ♦6 (3-0). Prerequisite: Evidence of a competent reading knowledge of one relevant language other than English.

C LIT 550. *Comparative Studies in Romantic Literature.* ♦6 (3-0). Prerequisite: Evidence of a competent reading knowledge of one relevant language other than English.

C LIT 555. *Comparative Studies in Literature of the late Nineteenth Century.* ♦6 (3-0). Prerequisite: Evidence of a competent reading knowledge of one relevant language other than English.

C LIT 620. *Comparative Slavonic Literature.* ♦6 (3-0). Prerequisite: Evidence of a competent reading knowledge of two Slavonic languages.

C LIT 640. *Socialist Realism: Theory and Practice.* ♦6 (3-0). A critical survey of the theory of socialist realism against the background of American and West European literary theory together with an analysis of Soviet and Western literary texts commonly labelled socialist realist. Prerequisite: Evidence of a competent reading knowledge of one relevant language other than English. Note: This course is also listed as Slavonics 640.

C LIT 648. *Comparative Studies in French and English Literature, 1830-1900.* ♦6 (3-0) Prerequisite: A competent reading knowledge of French.

C LIT 649. *Franco-German Literary Relations during the Nineteenth Century.* ♦6 (3-0).

C LIT 695. *Anglo-German Literary Relations from the Sixteenth to the Nineteenth Century.* ♦6 (3-0).

## 44.9 / *Drama*

### 44.9.1 / JUNIOR COURSES

DRAMA 200. *Theatre Art Analysis.* ♦6 (3-0). Critical analysis of selected plays and its application to creative solutions in their production. Note: Restricted to B.F.A. Drama students.

DRAMA 210. *Introduction to Theatre Art.* ♦6 (3-0). Analysis of contributory arts of the theatre: playwriting, acting, designing and directing.

DRAMA 240. *Voice and Speech.* ♦6 (4L). Intensive voice and speech improvement; oral interpretation of poetry, prose and dramatic literature.

DRAMA 250. *Acting.* ♦6 (6L). Developing a sense of dramatic form through improvisation and environmental techniques; enactment of scenes from the modern repertoire.

DRAMA 252. *Improvisation.* ♦6 (6L). Speech improvisation and creative movement with emphasis on imaginative development.

DRAMA 270. *Stagecraft.* ♦6 (4L). Investigation of skills involved in staging a play, such as use of materials and methods of construction.

DRAMA 271. *Theatre Design Aesthetics.* ♦6 (4L). Practical exploration and discovery of aesthetic elements in theatre art. Note: Restricted to B.F.A. Drama students.

### 44.9.2 / SENIOR COURSES

DRAMA 300. *Theatre of the Past.* ♦6 (3-0). History of the theatre from the Greeks to the seventeenth century; study of major plays and theatre artists in the context of their time; parallels with other art forms.

DRAMA 320. *Creative Drama.* ♦6 (3-0). Practical and theoretical approach to the creative use of drama in developing resources within the individual.

DRAMA 330. *Movement.* ♦6 (4L). Introduction to movement forms for the actor. Note: Restricted to B.F.A. Drama students.

DRAMA 340. *Advanced Voice and Speech.* ♦6 (4L). Advanced phonetics and oral interpretation; vocal characterization and sight reading. Note: Restricted to B.F.A. Drama students. Prerequisite: Drama 240.

DRAMA 350. *Advanced Acting.* ♦6 (6L). Discovery and development of techniques of characterization; intensive text analysis and classroom production. Prerequisite: Drama 250. Note: Restricted to B.F.A. Drama students.

DRAMA 351. *Basic Make-up.* ♦1 (either term, 0-3). Practice in use of basic materials and in creating stage make-up. Note: Restricted to B.F.A. Drama students.

DRAMA 360. *Playwriting.* ♦6 (3-0). Study of and practice in playwriting. Prerequisite: English 200 and consent of the Drama Department. Note: Formerly Drama 460.

DRAMA 370. *Theatre Design.* ♦6 (3L). Study of and practice in the principles of design for the play. Prerequisite: Drama 271. Note: Restricted to B.F.A. Drama students.

DRAMA 373. *Production Techniques.* ♦6 (6L). Study of and practice in use of tools and materials of theatre design and production. Prerequisite: Drama 370. Note: Restricted to B.F.A. Drama students.

DRAMA 374. *Stage Drafting.* ♦3 (2L). Procedures of and practice in drafting for the stage. Prerequisite: Drama 270. Note: Restricted to B.F.A. Drama students.

DRAMA 380. *Production Management.* ♦3 (First Term, 3-0). The study of production management with particular reference to stage managers, crew heads, and other key production personnel. Prerequisite: Drama 270.

DRAMA 381. *Elements of Directing.* ♦3 (Second Term, 4-0). Developing the director's creative use of the elements of directing, such as composition, movement, and picturization.

DRAMA 390. *Production Techniques.* ♦4 (1-4). Planning for major productions, with members of the class responsible for planning and supervising crew work in construction, lighting, costuming, make-up, and sound. Prerequisite: Drama 270.

DRAMA 392. *Acting Laboratory.* ♦1 (0-2). Rehearsal and performance of rôles. Corequisite: Drama 350. Note: Restricted to B.F.A. Drama students.

DRAMA 394. *Production Laboratory.* ♦1 (either term, 0-4). Practice in backstage management of a play in performance. Note: Restricted to B.F.A. Drama students.

DRAMA 400. *Modern Theatre.* ♦6 (3-0). Evolution of contemporary theatre art; study of major styles and movements since the eighteenth century with emphasis on today's theatre.

DRAMA 420. *Improvisional Production.* ♦6 (4L). Study of and practice in experimental production involving young people. Prerequisite: Drama 252 or consent of the Department.

DRAMA 430. *Theatre Movement.* ♦6 (4L). Study of and practice in period manners, movement and dance. Prerequisite: Drama 330 or consent of the Department. Note: Restricted to B.F.A. Drama students.

DRAMA 440. *Dialects and Accents.* ♦6 (4L). Survey of dialects and accents; intensive practice in representative examples from the British Isles, Europe, and North America. Prerequisite: Drama 340. Note: Restricted to B.F.A. Drama students.

DRAMA 450. *Styles of Acting.* ♦6 (6L). Study of and practice in the main period styles of acting; developing an actor's awareness of his place in the total dramatic event. Prerequisite: Drama 350. Note: Restricted to B.F.A. Drama students.

DRAMA 460. *Playwriting.* ♦6 (3-0). Study of and practice in playwriting. Prerequisite: English 200 and consent of the Department.

DRAMA 470. *Styles of Design.* ♦6 (3L). Study of and practice in design for the period play. Prerequisite: Drama 440. Note: Restricted to B.F.A. Drama students.

DRAMA 473. *History of Dress.* ♦3 (First Term, 3-0). The history of dress and its application to the stage.

DRAMA 480. *Directing.* ♦6 (3L). Problems of producing a play, such as analysis, casting, and rehearsing. Prerequisite: Drama 380 and Drama 381. Note: Restricted to B.F.A. Drama students.

DRAMA 490. *Advanced Production.* ♦3 (0-4). Advanced practical study in one of three fields—Acting, Directing, or Design. Prerequisite: Drama 390 or 450 or 480.

DRAMA 491. *Directing Projects.* ♦3 (0-4). Directing scenes from modern plays. Corequisite: Drama 480. Note: Restricted to B.F.A. Drama students.

DRAMA 492. *Acting Projects.* ♦3 (0-4). Rehearsal and performance of rôles in public productions. Corequisite: Drama 450. Note: Restricted to B.F.A. Drama students.

DRAMA 493. *Design Laboratory.* ♦3 (0-4). Practical experience in technical direction. Corequisite: Drama 470. Note: Restricted to B.F.A. Drama students.

DRAMA 500. *Dramatic Theory.* ♦6 (3-0). Survey of changing critical attitudes towards theatre; tracing the evolution of modern theatre aesthetics.

DRAMA 530. *Advanced Movement.* ♦1 (2L). Instruction to suit the actor's individual needs. Prerequisite: Drama 430 or consent of the Department.

DRAMA 540. *Advanced Speech.* ♦2 (2L). Individual instruction to suit the actor's vocal needs. Prerequisite: Drama 440. Note: Restricted to B.F.A. Drama students.

DRAMA 550. *Advanced Acting.* ♦6 (2-4). Assignments in major roles for public performance. Prerequisite: Drama 450.

DRAMA 551. *Advanced Make-Up.* ♦2 (1-2). Practice in use of special materials and in creating character make-up. Prerequisite: Drama 351. Note: Restricted to B.F.A. Drama students.

DRAMA 570. *Advanced Design.* ♦6 (3L). Study of and practice in design for the modern play. Prerequisite: Drama 470. Note: Restricted to B.F.A. Drama students.

DRAMA 580. *Advanced Directing.* ♦6 (3L). Problems of producing plays from the modern repertoire. Prerequisite: Drama 480. Note: Restricted to B.F.A. Drama students.

DRAMA 590. *Production Thesis.* ♦4 (0-6). A completely developed production book including a major paper on one of the following aspects of production: acting, directing, design, or technical practice. The thesis may be based on actual or a theoretical production. Prerequisite: One of Drama 470, 550, or 580.

DRAMA 591. *Advanced Directing Projects.* ♦6 (0-8). Directing and staging modern one-act plays. Corequisite: Drama 480. Note: Restricted to B.F.A. Drama students.

DRAMA 592. *Advanced Acting Projects.* ♦6 (0-8). Rehearsal and performance of roles in public productions. Prerequisite: Drama 492. Note: Restricted to B.F.A. Drama students.

DRAMA 593. *Advanced Design Projects.* ♦6 (0-8). Practical experience in assistant designing. Corequisite: Drama 570. Note: Restricted to B.F.A. students.

DRAMA 595. *Advanced Projects Seminar.* ♦4 (2-0). Critical analysis of advanced projects in acting, design, and directing. Corequisite: One of Drama 591, 592, or 593. Note: Restricted to B.F.A. Drama students.

### 44.9.3 / GRADUATE COURSES

DRAMA 600. *Methods and Tools of Research.* ♦6. (3-0).

DRAMA 602. *Seminar in Dramatic Theory and Criticism.* ♦6 (3-0). Research in selected problems.

DRAMA 603. *Research in Dramatic Literature.* ♦6 (3-0). Research in selected periods.

DRAMA 604. *Research in Theatre History.* ♦6 (3-0). Research in aspects of physical theatre and production.

DRAMA 610. *Applied Criticism.* ♦6 (3-0). Critical analysis of theatre practice.

DRAMA 670. *Styles in Total Design.* ♦6 (6L).

DRAMA 680. *Styles of Directing.* ♦6 (6L). Problems of producing period plays.

## 44.10 / *Economics*

### 44.10.1 / JUNIOR COURSE

ECON 200. *Principles of Economics.* ♦6 (3-0). A survey of various aspects of economics; the nature of economic problems and systems; the functions of money; commercial and central banking; national income analysis; monetary and fiscal policy; pricing under competitive and monopolistic conditions: selected topics in analysis and policy. Prerequisite: Mathematics 30 or 100.

### 44.10.2 / SENIOR COURSES

ECON 300. *Micro-Economic Analysis.* ♦6 (3-0). The theory of consumer behavior; price and output determination under competition, monopoly and other market structures; allocation of resources and resource pricing; distribution of income. Prerequisite: Economics 200. Note: Not to be taken by students who have credit in Economics 301.

ECON 301. *Intermediate Economic Theory.* ♦6 (3-0). Micro- and macro-economic analysis; the principles of price and output determination in product and factor markets; the theory of national income and product determination. Prerequisite: Economics 200. Note: Not to be taken by students who have credit in Economics 300 or 380.

ECON 305. *General Economics.* ♦6 (3-0). An introduction to economic principles, problems, and policies, with emphasis on the Canadian experience. Note: Open only to senior students who do not hold credit in Economics 200, 303 or 304. Not acceptable as a prerequisite to any other Economics course.

ECON 310. *Canadian Economic Development.* ♦6 (3-0). The relative growth of various industries and the regional distribution of economic activity with emphasis on the role of export staples, technology, capital accumulation, and government.

ECON 311. *Western European Economic Development.* ♦6 (3-0). A survey since the middle ages with emphasis on economic change in the United Kingdom, France, and Germany.

ECON 320. *International Economics.* ♦6 (3-0). The basis of international trade, balance of payments problems, and related matters, analysed theoretically and in relation to questions of economic policy. The development of the international economy since 1500, with emphasis on events since the Second World War. Prerequisite: Economics 200.

ECON 330. *Labor Economics.* ♦6 (3-0). The development and dynamics of trade unions, collective bargaining and government legislation. Supply of and demand for labor, wage determination, income shares and the structure of employment and unemployment. Prerequisite: Economics 200.

ECON 340. *Money and Banking.* ♦6 (3-0). The principles of money, monetary systems, commercial banking, central banking, monetary theory and policy, foreign exchange. Prerequisite: Economics 200.

ECON 350. *Public Finance.* ♦6 (3-0). The conditions under which individual economic goals can be maximized through non-market mechanisms; the allocation of resources, redistribution of income, and stabilization of the level of resource utilization; taxes and the goals of a tax system; government expenditure and revenues; compensatory fiscal and debt policies. Prerequisite: Economics 200.

ECON 367. *Economics of Agriculture.* See INTER D 367.

ECON 368. *Economics of World Agriculture.* See INTER D 368.

ECON 372. *Industrial Organization.* ♦6 (3-0). Problems arising from business concentration in an enterprise economy. The behavior and performance of firms in different market structures, including problems in defining the market, types and importance of barriers to new competition. Common law foundations of public policies towards business concentration. Problems of interpreting, administering, and enforcing anti-combines legislation in selected cases. Prerequisite: Economics 200 and Economics 300 recommended.

ECON 380. *Macro-Economic Analysis.* ♦ 6 (3-0). National income concepts and determination; the theory of aggregate consumption and investment; business cycle and growth applications of aggregate analysis. Prerequisite: Economics 200. Note: Not to be taken by students who have credit in Economics 301.

ECON 390. *Comparative Economic Systems.* ♦6 (3-0). A comparative study of the institutions and theories of important contemporary systems of economic organization, with emphasis on the "mixed" capital system, "command" economies of the Soviet type, and transitional systems embodying socialist as well as capitalist principles. A survey of socialist economic thought with emphasis on the economics of Marx. Prerequisite: Economics 200 or consent of the Department.

ECON 391. *The Soviet Economy.* ♦6 (3-0). The development and institutional arrangements of the Soviet economy; Marxian economics and Soviet economic policies; central planning of economic activity; Soviet economic performance and its evaluation. Prerequisite: Economics 200 or consent of the Department.

ECON 399. *Statistics for Economists.* ♦6 (3-1). An introduction to statistical concepts and their application in economics. Sources and uses of data in economic research; descriptive statistics; graphical methods; index numbers; elementary probability and sampling theory; estimation and tests of hypotheses; regression and correlation. Prerequisite: Economics 200.

ECON 400. *History of Economic Thought.* ♦6 (3-0). A survey of economic opinions and theories from ancient times to the present with special attention to modern times. Emphasis on both theoretical analysis and socio-economic structure at various epochs of economic thinking. Prerequisite: Economics 300 and 380 or consent of the Department.

ECON 401. *Economic Analysis.* ♦6 (3-0). Micro- and macro-economic analysis; price and distribution theory; aggregate consumption, investment and income determination. Prerequisite: Economics 301.

ECON 404. *Economic Statistics.* ♦6 (3-0). Application of statistical methods in economics with emphasis on regression analysis. Selected topics in mathematical statistics; the general linear regression model and associated econometric problems; survey of current econometric work. Prerequisite: Economics 300 or 301 or 380; a course in calculus; Economics 399 or equivalent; or consent of the Department.

ECON 406. *Applications of Mathematics to Economics.* ♦6 (3-0). Mathematical methods used in modern economic analysis. Elements of logic and set theory; review of the calculus; differential and difference equations; linear algebra; convex sets and functions; elements of game theory. Prerequisite: Economics 300 and 380. Mathematics 201 or 207.

ECON 410. *Economics of Underdeveloped Countries.* ♦6 (3-0). A survey of the economic conditions and problems of the under-developed countries of the world; main economic characteristics of under-developed countries and requirements of economic growth; measures for the economic development of low-income countries. Prerequisite: Economics 200.

## 44.10.3 / HONORS AND GRADUATE COURSES

ECON 503. *Microeconomic Theory I.* ♦3 (First Term, 3-0).

ECON 505. *Microeconomic Theory II.* ♦3 (Second Term, 3-0). Prerequisite: Economics 503.

ECON 507. *Econometrics I.* ♦3 (First Term, 3-0). Prerequisite: Economics 300 and 380; Economics 404 or equivalent; Mathematics 201 or 207.

ECON 508. *Econometrics II.* ♦3 (Second Term, 3-0). Prerequisite: Economics 507.

ECON 510. *Economics of Underdeveloped Countries.* ♦6 (3-0). Analysis of economic policy in underdeveloped countries; measurement of economic magnitudes; development of resources; rôles of government and foreign aid; problems in planning.

ECON 511. *Economic Development of Canada.* ♦6 (3-0). Contemporary and historical factors responsible for the economic growth and development of Canada with some attention to comparative factors operative in other industrialized countries.

ECON 521. *The Pure Theory of International Trade.* ♦3 (First Term, 3-0). Prerequisite: Economics 300 or 380, or 401, and preferably Economics 320.

ECON 522. *International Monetary Economics.* ♦3 (Second Term, 3-0). Prerequisite: Economics 521 or consent of the Department.

ECON 530. *Labor Economics.* ♦6 (3-0). Factors influencing the supply of and demand for labor services and the process of wage determination; the impact of collective bargaining, legislation, and government policy on wage levels, aggregate employment, and the structure of employment.

ECON 540. *Monetary Theory.* ♦3 (either term, 3-0). Note: For fourth-year honors and graduate students in Economics only.

ECON 546. *Soviet and East European Studies.* ♦6. See INTER D 546.

ECON 550. *The Public Sector of the Economy.* ♦3 (First Term, 3-0). Functions, transactions and growth of the public sector in the developed countries; analysis of the public decision-making and budgeting processes.

ECON 551. *Intergovernmental Fiscal Problems.* ♦3 (Second Term, 3-0). Problems of intergovernmental finance with emphasis upon the Canadian experience with special reference to financing education, health, social security and other public services; fiscal problems of metropolitan areas.

ECON 552. *Urban Economics.* ♦3 (either term, 3-0). Prerequisite: Economics 300 or 380 or consent of the Department.

ECON 560. *Agriculture in Developing Countries.* ♦6 (3-0).

ECON 564. *Regional Economic Analysis.* ♦3 (First Term, 3-0). Methods appropriate to the analysis of the economic structure, functioning and policies of regions within a national economy, regional accounting methods, input-output analysis, regional growth models, location theory, and the impact of national policies on regional characteristics.

ECON 565. *The Economics and Management of Natural Resources.* ♦3 (Second Term, 3-0). Economic principles governing the management and use of natural resources, including market forces and structure, comparative supply costs, transportation factors, domestic and foreign public policies, etc.

ECON 572. *Industrial Organization.* ♦6 (3-0). Contemporary industrial structure, behavior and performance; economic concentration; related Canadian and foreign public policies, together with relevant theoretical considerations.

ECON 581. *Macro-economics I.* ♦3 (First Term, 3-0). Prerequisite: Economics 380.

ECON 582. *Macro-economics II.* ♦3 (Second Term, 3-0). Prerequisite: Economics 581.

ECON 585. *Theory of Economic Policy.* ♦3 (First Term, 3-0).

ECON 591. *Comparative Economic Systems I.* ♦3 (First Term, 3-0).

ECON 592. *Comparative Economic Systems II.* ♦3 (Second Term, 3-0).

ECON 598. *Statistical Methods for Economists.* ♦3 (either term, 3-2). Note: Open only to graduate students without any previous course in statistics or those who have failed the preliminary statistics examination on entering the graduate economics program.

ECON 599. *Economic Statistics.* ♦3 (either term, 3-0). Prerequisite: Economics 399 or equivalent.

ECON 601. *Seminar in Microeconomic Theory I.* ♦3 (First Term, 3-0).

ECON 602. *Seminar in Microeconomic Theory II.* 3 (Second Term, 3-0).

ECON 607. *Advanced Mathematical Economics.* ♦3 (First Term, 3-0). Prerequisite: Consent of the Department.

ECON 608. *Advanced Econometrics.* ♦3 (Second Term, 3-0). Prerequisite: Consent of the Department.

ECON 611. *Economic Development.* ♦6 (3-0).

ECON 620. *International Economics.* ♦3 (First Term, 3-0). Prerequisite: Economics 521 and 422.

ECON 622. *Special Topics in International Economics.* ♦3 (Second Term, 3-0). Prerequisite: Economics 521 and 522.

ECON 630. *Labor Theory: an Integration.* ♦3 (First Term, 3-0). Prerequisite: 500-level labor economics courses, or consent of the Department.

ECON 631. *Labor Problems.* ♦6 (3-0).

ECON 632. *Manpower Resources and Allocation.* ♦3 (Second Term, 3-0). Prerequisite: 500-level labor economics courses, or consent of the Department.

ECON 640. *Monetary Economics.* ♦3 (either term, 3-0).

ECON 651. *Public Finance and Fiscal Policy.* ♦6 (3-0).

ECON 653. *Transportation and Public Utilities.* ♦6 (3-0).

ECON 661. *Agricultural Economics.* ♦6 (3-0).

ECON 663. *Agricultural Marketing.* ♦6 (3-0).

ECON 671. *Business and Government.* ♦6 (3-0).

ECON 681. *Advanced Macroeconomic Theory I.* ♦3 (First Term, 3-0).

ECON 682. *Advanced Macroeconomic Theory II.* ♦3 (Second Term, 3-0).

ECON 685. *Theory of Economic Policy.* ♦3 (Second Term, 3-0). Prerequisite: Consent of the Department.

ECON 693. *Topics in Comparative Economics I.* ♦3 (First Term, 3-0).

ECON 694. *Topics in Comparative Economics II.* ♦3 (Second Term, 3-0).

ECON 695. *Topics in Soviet Economy I.* ♦3 (First Term, 3-0).

ECON 696. *Topics in Soviet Economy II.* ♦3 (Second Term, 3-0).

## 44.11 / *English*

### 44.11.1 / JUNIOR COURSES

The English Department offers two junior courses: English 200 and English 210. The first, English 200, is required of all candidates for the B.A. in the general program, but is open to students in other programs, especially those who wish to make English one of their subjects of concentration or are planning to take senior courses in English. The second, English 210, though accepted as a prerequisite for senior courses, is designed as a terminal course for students who do not expect to take further courses in English. Only one of these may be offered for credit.

ENGL 200. *A Survey of English Literature from Chaucer to the Twentieth Century.* ♦6 (3-0). A close study of representative masterpieces. Essays and tests on the prescribed literature will be given to afford practice in setting down ideas in good English.

ENGL 210. *English Language and Literature.* ♦6 (3-0). Designed to increase appreciation of good lierature and to afford practice in setting down ideas in good English.

### 44.11.2 / SENIOR COURSES

NOTE: English 200 or 210 is a prerequisite for senior English courses.

ENGL 308. *Old English Language and Literature.* ♦6 (3-0). An introduction to the language and literature of Anglo-Saxon England.

ENGL 314. *Middle English Literature.* ♦6 (3-0). Characteristic themes and forms of English literature between 1200 and 1500, excluding Chaucer and the Chaucerian tradition.

ENGL 316. *Chaucer.* ♦6 (3-0). Major works of Chaucer and of selected poets of the fifteenth century.

ENGL 324. *Poetry and Prose of the Sixteenth Century.* ♦6 (3-0). Representative prose and poetry, including selections from the works of More, Spenser, Sidney, Shakespeare, and Donne.

ENGL 332. *Shakespeare.* ♦6 (3-0). Eighteen plays will be discussed, not all in great detail. Among the eighteen will be the following: *Love's Labour's Lost; As You Like It; The Tempest; Troilus and Cressida; Richard III; Henry IV, Part One; Henry V; Romeo and Juliet; Julius Caesar; Antony and Cleopatra; Hamlet; King Lear; Macbeth; Othello.*

ENGL 340. *Milton.* ♦6 (3-0).

ENGL 344. *Seventeenth Century Poetry and Prose.* ♦6 (3-0). The literature of the seventeenth century, studied in the light of intellectual developments of the period.

ENGL 348. *Restoration and Eighteenth Century Literature.* ♦6 (3-0). Special study of representative works of Dryden, Swift, Pope, Addison, and Johnson, with additional reading in the drama, poetry, and prose of the period.

ENGL 356. ♦6 (3-0). Selections from the Pre-Romantics and the Romantics, to include Burns, Blake, Wordsworth, Coleridge, Shelley, Keats, and Byron.

ENGL 364. *Poetry of the Victorian Period.* ♦6 (3-0). Selected works of Tennyson, Browning, Arnold, Clough, Fitzgerald, Rossetti, Morris, Meredith, F. Thompson, and Swinburne.

ENGL 372. *Currents of Thought in Victorian Prose Literature.* ♦6 (3-0). Representative works by Burke, Carlyle, J. S. Mill, Newman, Arnold, Ruskin, Huxley, Butler and Morris.

ENGL 373. *American Literature to 1900.* ♦6 (3-0). A selection of representative major writers. Emphasis on the writers of the "American Renaissance", especially Poe, Hawthorne, Emerson, Thoreau, Melville, Whitman, Mark Twain, and Henry James. Note: Not to be taken by students with credit in English 394.

ENGL 380. *Representative Works by British Writers.* ♦6 (3-0).

ENGL 383. *American Literature from 1900.* ♦6 (3-0). A selection of representative major writers. Note: Not to be taken by students with credit in English 394.

ENGL 384. *Canadian Literature.* ♦6 (3-0). An historical and critical study of the literature of English-speaking Canada.

ENGL 388. *The History of the English Language.* ♦6 (3-0). A detailed analysis of the historical development of the English language, together with some study in the prose tradition from the Old English period to the present day. Note: Some knowledge of French and Latin (or German) is recommended.

ENGL 390. *The Development of English Drama to 1800.* ♦6 (3-0). The works examined will include specimens of mediaeval drama and plays by Marlowe, Jonson, Webster, Dryden, Congreve, Sheridan, and others.

ENGL 391. *Modern British and American Drama.* ♦6 (3-0). Major works by modern British and American dramatists.

ENGL 392. *The English Novel.* ♦6 (3-0). Representative novels by Defoe, Richardson, Fielding, Smollett, Sterne, Austen, Scott, Dickens, Thackeray, Brontë, Hardy, and others.

ENGL 393. *The History of Literature Criticism.* ♦6 (3-0). A survey of the major developments in literary criticism from Aristotle to the present time.

ENGL 396. *Introduction to Creative Writing.* ♦6 (3-0). Practice and instruction in various literary forms. Note: Before registering in this course, students must obtain the consent of the Department, preferably at the end of the previous session.

ENGL 399. *Commonwealth Literature.* ♦6 (3-0). Emphasis on writers from Africa, the West Indies, and the Indian sub-continent.

ENGL 407. *Creative Writing: Fiction.* ♦6 (3-0). Prerequisite: English 396 or consent of the Department.

ENGL 408. *Creative Writing: Poetry.* ♦6 (3-0). Prerequisite: English 396 or consent of the Department.

## 44.11.3 / HONORS AND GRADUATE COURSES

ENGL 500. *Conference Course.* Special work arranged for senior honors students.

ENGL 501. *Seminar, Second Year Honors English.* ♦2 (1s-0).

ENGL 502. *Seminar, Third Year Honors English.* ♦2 (1s-0).

ENGL 503. *Seminar, Fourth Year Honors English.* ♦2 (1s-0).

ENGL 504. *Honors Tutorial.* In the spring of his third year the honors English student, in consultation with the Department, will arrange for a literary project to be pursued under the guidance of a member of the Department for the ensuing summer and winter. The project will involve study of some problem having to do with such matters as technique, genre, criticism, or theme.

ENGL 552. *Conference Course.* ♦6 (3-0).

ENGL 560. *Bibliography and Methods of Research.* ♦2 (1-0).

ENGL 568. *Literary Criticism—Principles and History.* ♦6 (3-0).

ENG 576. *Studies in the English Language.* ♦4 (2-0).

ENGL 584. *Creative Writing.* ♦6 (3-0).

ENGL 588. *Studies in American Literature.* ♦6 (3-0).

ENGL 590. *Canadian and Commonwealth Literature.* ♦6 (3-0).

ENGL 592. *Old Norse Literature.* ♦6 (3-0).

ENGL 610. *Studies in Old English Literature.* ♦6 (3-0).

ENGL 614. *Studies in Middle English Literature.* ♦6 (3-0).

ENGL 616. *Chaucer.* ♦6 (3-0).

ENGL 622. *The Scottish Chaucerians and English Literature of the Fifteenth Century* ♦6 (3-0).

ENGL 628. *Medieval Drama.* ♦6 (3-0).

ENGL 634. *Studies in Renaissance Poetry.* ♦6 (3-0).

ENGL 640. *Shakespeare.* ♦6 (3-0).

ENGL 641. *Studies in Elizabethan and Jacobean Drama.* ♦6 (3-0).

ENGL 646. *Seventeenth Century Poetry and Prose.* ♦6 (3-0).

ENGL 652. *Milton.* ♦6 (3-0).

ENGL 654. *Restoration and Eighteenth Century Drama.* ♦6 (3-0).

ENGL 658. *Studies in Eighteenth Century Literature.* ♦6 (3-0).

ENGL 660. *Studies in the Eighteenth Century Novel.* ♦6 (3-0).

ENGL 662. *Studies in the Romantic Novel.* ♦6 (3-0).

ENGL 664. *Studies in the Romantics.* ♦6 (3-0).

ENGL 670. *Currents of Thought in English Literature Since 1790.* ♦6 (3-0).

ENGL 671. *Studies in Victorian Poetry.* ♦6 (3-0).

ENGL 672. *The Victorian Novel.* ♦6 (3-0).

ENGL 676. *Studies in the Modern Novel.* ♦6 (3-0).

ENGL 678. *Studies in Twentieth Century Prose.* ♦6 (3-0).

ENGL 682. *Studies in Twentieth Century Poetry.* ♦6 (3-0).

ENGL 684. *Studies in Modern Drama.* ♦6 (3-0).

ENGL 692. *Technique of the Novel.* ♦6 (3-0).

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# 44.12 / *French*

Department of Romance Languages

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## 44.12.1 / JUNIOR COURSES

FREN 100. *Beginners' French.* ♦6 (5-0). Designed to enable students entering with complete matriculation but without French to begin their study of

this language in the University. Note: Normally, students will go from French 100 to French 200.

FREN 200. *First Year University French.* ♦6 (3-1). Intensive training in spoken and written French, including grammar, composition and literature.

FREN 201. *First Year University French For Teachers.* ♦6 (2-3). Designed to teach future teachers of French to speak the language. Two hours of grammar and three hours work in the language laboratory per week. Note: Arts students must obtain permission of the Dean before registering in this course.

FREN 205. *Reading Course* ♦6 (3-0). Note: Normally a prerequisite for French 305. Only with consent of the Department may it be used as a prerequisite for other senior French courses.

FREN 230. *Advanced First Year University French.* ♦6 (3-2). Designed for students having French 31 and honors students. These and French-speaking students are advised to take this course in place of French 200 or 201. Prerequisite: Consent of the Department.

NOTE: Only one of French 200, 201, 205, or 230 may be taken for degree credit.

## 44.12.2 / SENIOR COURSES

FREN 302. *French Pronunciation for Second Year Honors Students.* ♦2 (0-1).

FREN 305. *Survey of French Literature.* ♦6 (3-0). Selected periods and major works in French literature. Designed as a terminal course. Prerequisite: French 200 or 205.

FREN 330. ♦6 (3-0). Selections from representative French authors, history of French civilization, oral work in class and in the language laboratory, designed to improve the student's oral and written fluency.

FREN 340. *Composition and Stylistics.* ♦6 (3-0). Development of working skill through practice in prose composition. Initiation to the *dissertation.* Prerequisite or corequisite: French 330 or consent of the Department.

FREN 350. *Introduction to French Literature.* ♦6 (3-0). Major literary works from Villon to Camus. Prerequisite: French 330 or consent of the Department.

FREN 360. *Eighteenth Century.* ♦6 (3-0). Literature and the evolution of ideas in the Eighteenth Century: Fontenelle, Marivaux, Montesquieu, Voltaire, Diderot, Rousseau, Beaumarchais. Prerequisite: French 350 or consent of the Department.

FREN 370. *Romantic Period* ♦6 (3-0). The development of French romanticism. The poetry and romantic drama of Lamartine, Dumas *père,* Hugo, Musset, and Vigny. Prerequisite: French 350 or consent of the Department.

FREN 375. *Realism.* ♦6 (3-0). Definition and history of realism; the development of the novel: Stendhal, Merimée, Balzac, and Flaubert; and the poetry of Baudelaire. Prerequisite: French 350 or consent of the Department.

FREN 380. *Prose and Poetry of the Late Nineteenth Century.* ♦6 (3-0). Naturalism in the novel and of the Parnassian and Symbolist schools of poetry. Prerequisite: French 350 or consent of the Department.

FREN 390. *French Phonology.* ♦6 (3-0). Articulatory phonetics; recognition and production of speech sounds; phonetic notation. Phonetic analysis. Prosodic features.

FREN 400. *Seventeenth Century.* ♦6 (3-0). Literature and society of the seventeenth century in France. The classical theatre: Corneille, Molière, Racine; the novel; Descartes, Pascal; La Rochefoucauld and La Bruyère; La Fontaine. Prerequisite: One senior French course.

FREN 403. *Third Year Honors French Language Seminar.* ♦2 (1-0).

FREN 420. *Introduction to French-Canadian Literature.* ♦6 (3-0). Prerequisite: Two senior French courses.

FREN 475. *Contemporary French Novel.* ♦6 (3-0). The French novel and its development since 1900.

FREN 480. *Contemporary French Poetry and Theatre.* ♦6 (3-0). Major poetic works, their form and development; French theatre since the nineteenth century.

## 44.12.3 / HONORS AND GRADUATE COURSES

FREN 500. *Special Reading Course.* ♦6 (3-0). For graduate students who wish to prepare for the M.A. or Ph.D. language requirement.

FREN 510. *Seminar in French Composition.* ♦6 (3-0). Intensive training in the preparation and oral presentation of reports in French. Note: For fourth-year honors and graduate students.

FREN 590. *History of Criticism in France.* ♦3 (First Term, 3-0).

FREN 595. *Methods of Criticism.* ♦3 (Second Term, 3-0).

FREN 600. *Seminar in Medieval French Literature.* ♦6 (3-0).

FREN 601. *History of the French Language.* ♦6 (3-0).

FREN 602. *History of French Syntax.* ♦6 (3-0).

FREN 610. *Seminar in French Renaissance Literature.* ♦6 (3-0).

FREN 612. *The Spirit of Humanism in France and England at the Beginning of the Renaissance.* ♦6 (3-0).

FREN 614. *Rabelais.* ♦6 (3-0).

FREN 616. *Ronsard.* ♦6 (3-0).

FREN 618. *Montaigne.* ♦6 (3-0).

FREN 619. *Seminar in Seventeenth-Century Literature.* ♦6 (3-0).

FREN 620. *The French Moralists.* ♦6 (3-0). Not confined to the Classical period.

FREN 625. *Molière.* ♦6 (3-0).

FREN 629. *Seminar in Eighteenth-Century Literature.* ♦6 (3-0).

FREN 630. *The Eighteenth Century Novel.* ♦6 (3-0).

FREN 634. *Marivaux.* ♦6 (3-0).

FREN 636. *Voltaire.* ♦6 (3-0).

FREN 638. *Rousseau.* ♦6 (3-0).

FREN 640. *Seminar in Nineteenth-Century Literature.* ♦6 (3-0).

FREN 645. *Stendahl.* ♦6 (3-0).

FREN 648. *Literature and the Plastic Arts from the Time of Delacroix and Baudelaire.* ♦6 (3-0).

FREN 651. *The Naturalistic Novel.* ♦6 (3-0).

FREN 655. *The Late Nineteenth Century Theatre.* ♦6 (3-0).

FREN 660. *Seminar in Twentieth-Century Literature.* ♦6 (3-0).

FREN 665. *Valéry.* ♦6 (3-0).

FREN 670. *Proust.* ♦6 (3-0).

FREN 699. *Conference Course.* A detailed study of some great author or literary question not dealt with in the other honors or graduate courses. Designed to meet the needs of individual honors or graduate students.

## 44.13 / *Geography*

### 44.13.1 / JUNIOR COURSE

NOTE: Descriptions of Geography 201, 301, and other Geography courses considered to be Science courses will be found in the Faculty of Science section of the Calendar (§ 184.11, below).

GEOG 200. *General Geography.* ♦6 (3-0). A survey course covering various aspects of Geography, including the physical, human and regional. Normally a terminal course.

### 44.13.2 / SENIOR COURSES

GEOG 300. *Human Geography.* ♦6 (3-0). The significance of human distribution on the earth. Man's relation to the physical environment; world population problems; cultural patterns in the world; aspects of political and economic geography in selected world trouble areas; racial geography and urban geography. Note: Students planning on taking this course are strongly urged to precede it by Geography 201.

GEOG 302. *Economic Georgraphy.* ♦6 (3-0). Analysis of the locational characteristics of economic activities throughout the world. Renewable and non-renewable resources and raw materials, agricultural, extractive, manufacturing and service industries reviewed systematically and in place. The significance of location and spatial arrangement with respect to the relationships between geography and economics.

GEOG 348. *An Introduction to the Tropical World.* ♦6 (3-0). The significance of zonation of the earth into tropical and extra-tropical areas. Physical, historical, cultural, and economic character and potential of the tropics. A geographic assessment of the requirements and future role of the underdeveloped tropics. Prerequisite: Consent of the Department. Note: Students intending to take this course are strongly urged to precede it by Geography 201.

GEOG 380. *Settlement Geography.* ♦6 (3-0). The geography of settlement, both rural and urban; regions and problems of pioneer settlement, materials and form of shelter in the geographic landscape, patterns of dispersed and agglomerated settlement, urbanization in the world. Prerequisite: Consent of the Department.

GEOG 400. *Anglo-America.* ♦6 (3-0). The regional geography of Canada and the United States. The physical framework of these countries and its significance in their historical development; the concept of the geographic region, the pattern and characteristics of these regions, with selected detailed studies. Prerequisite: A previous course in Geography or consent of Department.

GEOG 402. *Northern Lands.* ♦6 (3-0). Exploration, physical and human characteristics, possibilities of development and settlement of Arctic and sub-Arctic regions. Special emphasis on Alaska, northern Canada, Greenland, and Scandinavia. Prerequisite: A previous course in Geography or consent of Department.

GEOG 404. *Europe.* ♦6 (2-1s-3). Not offered 1968-69.

GEOG 406. *Western Canada.* ♦6 (3-0). Resources, patterns of development, and regions of Western Canada. Emphasis on the developed parts of the Prairie Provinces and British Columbia. Prerequisite: One of Geography 201, 300, 302 or consent of the Department.

GEOG 408. *The U.S.S.R.* ♦6 (3-0). Regional geography of the Soviet Union. Prerequisite: Consent of the Department.

GEOG 410. *Geography in Planning.* ♦6 (2L-1S). Selected historical, theoretical, and practical aspects of land use planning in various parts of the world. Physical and cultural aspects of planning projects and problems; appraisal of planning techniques. Prerequisite: Consent of the Department.

GEOG 412. *Latin America.* ♦6 (3-0). A survey of the physical features of Middle and South America; consideration of aboriginal peoples; settlement by the Europeans; and a regional analysis of the individual countries. Prerequisite: A course in geography or consent of the Department.

GEOG 414. *Africa.* ♦6 (3-0). Exploration and physical and human characteristics of the African continent. Asiatic and European influences in the geography of the peoples of Africa; changing attitudes towards resources of the continent; consequences of its physical location; historical and economic relations with the rest of the world since 1500. Regional studies with emphasis on Africa's political and economic problems and its resource potentials in the present-day world. Prerequisite: A previous course in geography or consent of the Department.

GEOG 416. *Industrial Geography.* ♦6 (3-0). A systematic survey of manufacturing, and raw materials, transport, energy, and markets in their areal context and in relation to manufacturing. Geographic analysis of the character of representative areas including both major manufacturing regions and underdeveloped territories. Prerequisite: Geography 302 or consent of the Department.

GEOG 420. *Political Geography.* ♦6 (3-0). Political areas—at the state and sub-state levels—as geographical phenomena. The relationship between political process and the spatial and locational qualities of political areas. Case studies illustrating the geographical aspects of nationalism, boundaries, micro-states, territorial waters, etc. The influences of politics on geography (political geography) and geography on politics (geopolitics).

GEOG 422. *Southwest Pacific.* ♦6 (2-1s-2). The geography of Australia, New Zealand, and the islands of Oceania, with, where appropriate, special attention to the geographic implications of the social and economic problems of widely scattered dependent and underdeveloped territories and of the traditionally agricultural lands. Prerequisite: A previous course in Geography or consent of the Department.

GEOG 424. *Resource Conservation.* ♦6 (2-1s-2). Principles of natural resource conservation with particular reference to planning conservation programs at international, national and local levels. Prerequisite: A previous course in Geography or consent of the Department.

GEOG 428. *Canada.* ♦6 (3-0). A survey of the natural features, settlement patterns, and economic development in Canada. Special problems of regional development in Eastern and Western Canada. Prerequisite: Consent of the Department. Note: Students may not receive credit for both Geography 406 and 428.

GEOG 456. *Agricultural Geography* ♦6 (3-0). The development of regional patterns of agricultural production. Prerequisite: Geography 201 or consent of the Department.

GEOG 480. *Urban Geography* ♦6 (3-0). Processes influencing spatial patterns in urban areas. Emphasis on the application of geographic concepts to the understanding of contemporary cities. Field exercises in the Edmonton area. Prerequisite: Consent of the Department.

## 44.13.3 / HONORS AND GRADUATE COURSES

GEOG 500. *History and Nature of Geography.* ♦6 (1-2s-1). Geography from ancient times to the present; the most important geographers and an assessment of their contributions; significant current geographic concepts; current major developments within special branches of geography; geography in other countries. Prerequisite: Consent of the Department.

GEOG 502. *Reading and Seminar Course.* ♦6.

GEOG 506. *Scandinavia.* ♦6 (3-1s). The regional geography of Norway, Sweden, Denmark, and Finland, with aspects of the historical, economic, and political geography of the area. Prerequisite: Consent of the Department.

GEOG 508. *Land Use Analysis and Planning.* ♦6 (1-2s). Geographic background to urban and regional developments; analysis of land use patterns and problems in urban and rural areas; use of this analysis in the preparation of urban and regional development plans. Prerequisite: Geography 410 or consent of the Department.

GEOG 510. *Historical Geography.* ♦6 (1-2s). The development of historical geography and its relationship to geography and history; case studies of the geography of selected areas at given times in the past utilizing regional and topical approaches. Prerequisite: A previous course in geography or consent of the Department.

GEOG 512. *Advanced Urban Geography.* ♦6 (3s-0). Nature and extent of urbanization; urban form and functions; urban-regional relationships including central place theory. A conceptual approach together with consideration of the actual nature of urban development in many parts of the world. Prerequisite: Geography 410 or an undergraduate course in urban geography, or consent of the Department.

GEOG 523. *Geographic Concepts and Research Methods.* ♦6 (3-0). Current concepts and research methods with some consideration of their historical development, the role of theory in research, and of the organization of field study. Prerequisite: Consent of the Department. Note: Required of all fourth-year honors and first-year graduate students in Geography.

GEOG 525. *Field School in Geography.* ♦3 A survey of the geography of a selected region. Field studies for a week in September preceding registration, followed by the preparation of reports on specified topics. Reconaissance and microstudies employing geographical field techniques. Note: Required of candidates for the master's degree in Geography.

GEOG 542. *Seminar on Latin America.* ♦6 (3s-0).

GEOG 544. *Seminar on Africa.* ♦6 (3s-0). A comparative regional study of the way in which the African landscapes, both physical and cultural, have assumed their present character since the fifteenth century. Special reference to the geographical ramifications of the problems confronting selected countries of Africa south of the Sahara.

GEOG 546. *Soviet and East European Studies.* See INTER D 546.

GEOG 548. *The Tropical World.* ♦6 (3s-0). Definition and delimitation of the humid and nonhumid tropics; the evolution of the physical and cultural landscapes in a tropical environment; an evaluation of the future role of the underdeveloped tropics in the modern world. Regional differentiation between the American, African, and Australasian tropics will be treated by staff specialists.

GEOG 550. *Research in Regional Geography* ♦6

GEOG 552. *Research in Human Geography.* ♦6.

GEOG 553. *Special Research Problems.* ♦6.

GEOG 558. *Transportation Geography.* ♦6 (3s-0). Basic concepts and principles of transportation geography with particular emphasis on the evolution and distribution of transportation facilities; the role of transportation services in economic geography; and their significance in both interregional and intraregional interactions.

GEOG 580. *Seminar on Geography of Settlement.* ♦6 (3s-0).

GEOG 630. *Advanced Research in Regional Geography.* ♦6.

GEOG 680. *Advanced Research in Human Geography.* ♦6.

GEOG 690. *Seminar on Geographic Thought.* ♦6.

GEOG 696. *Special Problems.* ♦6.

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# 44.14 / *German*

Department of Germanic Languages and General Linguistics

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## 44.14.1 / JUNIOR COURSES

GERM 100. *Beginners' German.* ♦6 (3-2). Designed to impart practical skill in spoken and written German. The oral approach will be followed. The Department's language laboratory will be used for drill and will also be available to students for individual practice.

GERM 200. *First Year University German.* ♦6 (3-1). Designed to develop ability in speaking, reading and writing German, using modern short stories, cultural readers, and audio-visual aids. Prerequisite: German 30, German 100, or the equivalent.

GERM 210. *Scientific German.* ♦6 (3-0). An intensive course to give beginning students a reading knowledge of scientific German. Note: Not open to general program students. Especially designed to meet the needs of honors students in Science departments and of students in the professional faculties desiring a knowledge of scientific German.

## 44.14.2 / SENIOR COURSES

GERM 302. *Practical Oral Study of the German Language.* ♦2 (0-1). For second year honors students.

GERM 310. *Advanced Scientific German.* ♦6 (3-0). Reading of advanced scientific and technical texts, supplemented by a systematic and thorough discussion of grammatical difficulties and "trouble makers" in German scientific literature. Prerequisite: German 30 or German 100 or German 210 or their equivalent. Note: Students who pass German 310 with a grade of 6 or better will be considered by the Department as having fulfilled the reading requirement in German for the Ph.D. at The University of Alberta.

GERM 330. *German Language and Culture.* ♦6 (3-0). German phonology, grammar and style. Lectures and readings on German life, literature and civilization. Prerequisite: German 200 or consent of the Department.

GERM 350. *Survey of German Literature.* ♦6 (3-0). Selected periods and major works in German literature. Prerequisite: German 200 or consent of the Department.

GERM 370. *German Enlightenment and Sturm und Drang.* ♦6 (3-0). The background of the *Aufklärung* and *Sturm und Drang,* with study of representative works. Prerequisite: German 200 or consent of the Department.

GERM 380. *German Classicism.* ♦6 (3-0). The ideas and literature of German Classicism; the works of Goethe, Schiller, Hölderlin, and Kleist. Special emphasis on the works of Goethe. Prerequisite: German 200 or consent of the Department.

GERM 385. *German Romanticism.* ♦6 (3-0). Historical and cultural background and literature of the German Romantic movement. Works of A. W. Schlegel, Friedrich Schlegel, Wackenroder, Novalis, Tieck, Brentano, Eichendorff, and E. T. A. Hoffmann. Prerequisite: German 200 or consent of the Department.

GERM 398. *Middle High German Language and Literature.* ♦6 (3-0). Background and structure of Middle High German together with a critical analysis of selected texts in the original. Prerequisite: One senior German course or consent of the Department.

GERM 400. *German Literature of the Nineteenth Century.* ♦6 (3-0). The leading exponents of nineteenth century drama, fiction, and poetry, including the background of Romanticism, of the Young Germany Movement, of Realism, and of Naturalism. Prerequisite: German 200 or consent of the Department.

GERM 403. *Practical Oral Study of the German Language.* ♦2 (0-1). For third year honors students.

GERM 430. *German Literature from 1300 to 1700.* ♦6 (3-0). The history of German literature in the later Middle Ages and early modern times, with analysis of representative works. Prerequisite: One senior German course or consent of the Department.

GERM 450. *Modern German Literature.* ♦6 (3-0). Literary movements since Naturalism (Impressionism, Expressionism, contemporary literature). Representative authors of each period. Interpretation of poems, dramas, *Novellen,* and novels. Prerequisite: One senior German course or consent of the Department.

GERM 460. *The Development of a Genre in German Literature.* ♦6 (3-0). The novel, the *Novelle* or the drama, with interpretation of examples. Prerequisite: A senior German course.

### 44.14.3 / HONORS AND GRADUATE COURSES

Before registering for these courses, students must consult the Department to ensure that they are qualified to undertake the work.

GERM 500. *Special Reading Course.* ♦6 (3-0). Intensive study of essential grammar, reading of graded texts, and translation of texts dealing with the students' own fields. Note: Designed for graduate students preparing themselves for the Ph.D. language requirement in German. Those obtaining a grade of 6 or better will be considered by the Department as having fulfilled the requirement. Not open to undergraduates.

GERM 504. *Practical Oral Study of the German Language.* ♦2 (0-1). For fourth year honors students.

GERM 510. *Advanced German Composition.* ♦4 (2-0). Difficult problems of grammar, idioms and style. Note: Required of all students in honors or majoring in German.

GERM 595. *Bibliography and Methodology.* ♦6 (3-0).

GERM 608. *Early Middle High German Literature.* ♦6 (3-0).

GERM 610. *Classical Middle High German Literature.* ♦6 (3-0).

GERM 612. *Late Middle High German Literature.* ♦6 (3-0).

GERM 614. *Humanism, Reformation, and Baroque.* ♦6 (3-0).

GERM 618. *Enlightenment.* ♦6 (3-0).

GERM 620. *Classicism.* ♦6 (3-0).

GERM 622. *Goethe.* ♦6 (3-0).

GERM 624. *Schiller.* ♦6 (3-0).

GERM 625. *Romanticism.* ♦6 (3-0).

GERM 635. *Realism.* ♦6 (3-0).

GERM 637. *Naturalism.* ♦6 (3-0).

GERM 639. *Expressionism.* ♦6 (3-0).

GERM 645. *Twentieth Century Literature.* ♦6 (3-0).

GERM 655. *Studies in German Poetry.* ♦6 (3-0).

GERM 665. *Studies in the German Novel.* ♦6 (3-0).

GERM 675. *Studies in the German Novelle.* ♦6 (3-0).

GERM 685. *Studies in German Drama.* ♦6 (3-0).

GERM 693. *Studies in German Folklore.* ♦6 (3-0).

GERM 695. *Studies in Literary Criticism.* ♦6 (3-0).

GERM 698. *Special Topics in German Literature.* ♦6 (3-0).

GERM 699. *Conference Course.* Detailed study of an author, period, genre, or any literary problem not dealt with in the honors or graduate courses listed above. Designed to meet the needs of individual honors or graduate students.

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## 44.15 / *Germanic Linguistics and Philology*

Department of Germanic Languages and General Linguistics

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GERM 540. *Old High German.* ♦3 (First Term, 3-0).

GERM 550. *Gothic.* ♦3 (First Term, 3-0).

GERM 560. *History of the German Language.* ♦3 (First Term, 3-0).

GERM 575. *Studies in Indo-European.* ♦3 (First Term, 3-0).

GERM 580. *Comparative German Grammar.* ♦3 (Second Term, 3-0).

GERM 590. *Old Saxon.* ♦3 (Second Term, 3-0).

GERM 697. *Special Topics in Germanic Linguistics and Philology.* ♦6 (3-0).

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## 44.16 / *Greek*

Department of Classics

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### 44.16.1 / JUNIOR COURSE

GREEK 100. *Beginners' Greek.* ♦6 (5-0). Essential grammar and vocabulary, the reading of easy Greek and simple sentences for translation into Greek.

### 44.16.2 / SENIOR COURSES

GREEK 300. *Greek Authors and Prose Composition.* ♦6 (3-0). Sight translation. Review of Greek forms. More difficult sentences for translation into Greek. Note: This course follows Greek 100.

GREEK 311. *Elementary Composition.* ♦ (1-0). Principles of grammar and the writing of Greek sentences. Note: Primarily for Honors students.

GREEK 381. *Herodotus, Aristophanes and Menander.* ♦6 (3-0). Herodotus, *History*; Aristophanes, *Frogs;* Menander, *Dyskolos.*

GREEK 382. *Thucydides, Euripides, Plato.* ♦6 (3-0). Thucydides, Book I; Euripides, *Medea;* Plato, *Apology.*

GREEK 383. *Plato, Sophocles, Aristophanes.* ♦6 (3-0). Plato, *Republic,* Books I-II; Sophocles, *Antigone* (Oxford Classical Text); Aristophanes, *Birds* (Stanford: Macmillan).

GREEK 384. *Aeschylus, Demosthenes, Thucydides.* ♦6 (3-0).
GREEK 385. *Koine Greek.* ♦6 (3-0). Reading and literary studies in the New Testament, the Church Fathers and other Koine writings. Prerequisite or corequisite: One of Greek 381, 382, 383 or 384.
GREEK 411. *Intermediate Composition.* ♦2 (1-0). The writing of Greek prose. Corequisite: One of Greek 381, 382, 383, or 385. Note: Primarily for honors students.

### 44.16.3 / HONORS AND GRADUATE COURSES

GREEK 501. *Plato and Aristotle.* ♦6 (3-0).
GREEK 502. *Homer, Iliad.* ♦6 (3-0).
GREEK 503. *Greek Lyric Poetry.* ♦6 (3-0).
GREEK 505. *Greek Comedy.* ♦6 (3-0).
GREEK 506. *Greek Orators.* ♦6 (3-0).
GREEK 507. *Greek Tragedy.* ♦6 (3-0).
GREEK 508. *Thucydides.* ♦6 (3-0).
GREEK 509. *Hellenistic Poetry.* ♦6 (3-0).
GREEK 511. *Advanced Greek Prose Composition.* ♦2 (1-0).
GREEK 517. *Studies in Greek Literature.* ♦6 (3-0).
GREEK 518. *Readings in Hellenistic History.* ♦6 (3-0).
GREEK 519. *Readings in Greek History.* ♦6 (3-0).
GREEK 521. *History of the Greek Language.* ♦3 (either term, 3-0). Prerequisite: Greek 300 or equivalent.
GREEK 522. *Greek Epigraphy.* ♦3 (either term, 3-0). Prerequisite: Greek 300 or equivalent.
GREEK 620. *The Greek and Latin Epigram.* ♦6 (3-0).

## 44.17 / *Hebrew*

St. Stephen's College

For a three-course sequence in Hebrew offered by St. Stephen's College, see § 246.2.4 of the General section of the Calendar.

## 44.18 / *History*

### 44.18.1 / JUNIOR COURSES

HIST 200. *European History.* ♦6 (3-1s). The evolution of European society from the decline of the Roman Empire in the West to the present. Designed to provide a foundation for senior and advanced History courses, and also background for study in related humanities and social sciences.
HIST 201. *European History since the Renaissance.* ♦6 (3-0).

### 44.18.2 / SENIOR COURSES

HIST 300. *Medieval Europe.* ♦6 (3-0).
HIST 304. *Europe in the Age of the Renaissance and Reformation.* ♦6 (3-0).
HIST 307. *Europe in the Seventeenth and Eighteenth Centuries.* ♦6 (3-0).
HIST 309. *Revolutionary and Nineteenth-Century Europe.* ♦6 (3-0).
HIST 310. *Twentieth-Century Europe.* ♦6 (3-0).
HIST 311. *History of International Relations since 1939.* ♦6 (3-0).
HIST 320. *France.* ♦6 (3-0). A survey of French history, with emphasis on the period since 1661.
HIST 322. *Germany since* 1648. ♦6 (3-0).
HIST 324. *Russia.* ♦6 (3-0). A survey from Kievan times to the present, with emphasis on the Imperial period.
HIST 326. *The Soviet Union.* ♦6 (3-0). An historical survey of domestic and foreign policy since 1917.
HIST 340. *Social and Economic History of Europe.* ♦6 (3-0).
HIST 350. *British History.* ♦6 (3-0). A survey of the history of the British Isles to 1914.
HIST 351. *English Constitutional History.* ♦6 (3-0).
HIST 352. *The British Empire and Commonwealth.* ♦6 (3-0).
HIST 353. *British Medieval History.* ♦6 (3-0). A survey from Roman times to 1485.
HIST 354. *British History,* 1485-1714. ♦6 (3-0). A survey of the history of the British Isles from 1485 to the accession of the Hanoverian dynasty in 1714.
HIST 355. *British History since* 1714. ♦6 (3-0). A survey from the accession of George I to the Second World War.
HIST 360. *American History,* 1482-1941. ♦6 (3-0).
HIST 370. *Canada.* ♦6 (3-0). A survey of Canadian political and social history.
HIST 375. *Canada in the Twentieth Century.* ♦6 (3-0). Prerequisite: History 370.
HIST 380. *The Far East.* ♦6 (3-0). A survey of the histories of China and Japan.
HIST 381. *Japan.* ♦6 (3-0).
HIST 383. *China.* ♦6 (3-0).
HIST 385. *Tropical Africa.* ♦6 (3-0). Early history, alien influence, conquest, and independence. Note: Not offered, 1968-69.

### 44.18.3 / ADVANCED COURSES

The following courses are designed for third-year, honors, and graduate students; not all are offered in any given year. Normally they are conducted as seminars and the precise topics covered in any given course may vary from year to year. Some account, therefore, may be taken of the particular interests of students within the framework of the course.

Normally, students who take these courses are expected to have at least two previous courses in History; if they do not, they must obtain the consent of the Department to their registration, and the Department will consider their special needs. For some courses there are additional specified requirements.

HIST 400. *Topics in Medieval European History.* ♦6 (3-0).
HIST 401. *Topics in Byzantine History.* ♦3 (either term, 3-0).
HIST 402. *Topics in the History of Medieval France.* ♦3 (either term, 3-0).
HIST 404. *Renaissance and Reformation.* ♦6 (3-0).
HIST 421. *Topics in Modern German History before* 1870. ♦6 (3-0).
HIST 424. *Topics in Soviet History.* ♦3 (either term, 3-0).
HIST 427. *Topics in Russian History from Kievan times to the present.* ♦6 (3-0).
HIST 428. *Eastern Europe since 1800.* ♦3 (either term, 3-0).
HIST 429. *Topics in the History of Germany since 1870.* ♦6 (3-0).
HIST 430. *The Intellectual History of Europe since 1300.* ♦6 (3-0).

HIST 431. *Topics in the History of Modern France to 1789.* ♦6 (3-0).
HIST 432. *Topics in the History of Modern France since 1789.* ♦6 (3-0).
HIST 451. *Topics in English Medieval History.* ♦6 (3-0).
HIST 452. *Topics in Tudor and Stuart History.* ♦6 (3-0).
HIST 454. *English Society in the Nineteenth Century.* ♦6 (3-0).
HIST 461. *Topics in American Westward Expansion.* ♦6 (3-0).
HIST 465. *American History to 1876.* ♦6 (3-0).
HIST 466. *American History since 1876.* ♦6 (3-0).
HIST 469. *American Foreign Policy.* ♦6 (3-0).
HIST 470. *The Canadian West to 1870.* ♦3 (either term, 3-0).
HIST 471. *The Canadian West since 1870.* ♦3 (either term, 3-0).
HIST 472. *Canada to 1791.* ♦3 (either term, 3-0).
HIST 473. *Canada, 1791-1867.* ♦3 (either term, 3-0).
HIST 474. *Canada 1867-1914.* ♦3 (either term, 3-0).
HIST 475. *Canada since 1914.* ♦3 (either term, 3-0).
HIST 476. *French Canada Since 1867.* ♦6 (3-0).
HIST 477. *Topics in Canadian History.* ♦6 (3-0). Prerequisite: Satisfactory completion of History 370 with a grade of 7 or better.
HIST 480. *Topics in East Asian History.* ♦6 (3-0).
HIST 486. *Topics in British Empire and Commonwealth History.* ♦6 (3-0).

### 44.18.4 / HONORS AND GRADUATE COURSES

HIST 399. *Seminar, Second-Year Honors History.* ♦2 (0-1s).
HIST 499. *Seminar, Third-Year Honors History.* ♦2 (0-1s).
HIST 501. *Special Subject, Fourth Year Honors History.* ♦6 (3-0). Preparation of the Honors essay, required in the fourth year of the Honors program.
HIST 511. *Medieval British History (Comprehensive).* ♦6 (3-0).
HIST 512. *Modern British History (Comprehensive).* ♦6 (3-0).
HIST 513. *Canadian History (Comprehensive).* ♦6 (3-0).
HIST 514. *American History (Comprehensive).* ♦6 (3-0).
HIST 515. *Medieval European History (Comprehensive).* ♦6 (3-0).
HIST 516. *European History, 1500-1789 (Comprehensive).* ♦6 (3-0).
HIST 517. *European History, since 1789 (Comprehensive).* ♦6 (3-0).
HIST 518. *Russian and East European History (Comprehensive).* ♦6 (3-0).
HIST 519. *British Empire and Commonwealth History (Comprehensive).* ♦6 (3-0).
HIST 520. *East Asian History (Comprehensive).* ♦6 (3-0).
HIST 546. *Soviet and East European Studies.* See INTER D 546.
HIST 599. *Directed Study.* ♦6 (3-0). Note: For students in the fourth year of the Honors program.
HIST 600. *Conference Course.* Directed studies in special subjects to meet individual requirements.
HIST 602. *Philosophy of History and Historical Methodology.* ♦6 (3-0). Note: Required of all candidates for higher degrees in History.
HIST 605. *Research Seminar.* ♦3 (either term, 3-0). The specific area of research is announced by the Department in the term before the seminar is offered.
HIST 621. *Medieval Europe.* ♦6 (3-0).
HIST 623. *Early Modern Western Europe.* ♦6 (3-0).
HIST 625. *Modern Western Europe.* ♦6 (3-0).
HIST 626. *Russia and Eastern Europe Since 1462.* ♦6 (3-0).
HIST 652. *Medieval England.* ♦6 (3-0).
HIST 654. *Early Modern England.* ♦6 (3-0).
HIST 656. *Modern England.* ♦6 (3-0).
HIST 658. *The British Empire.* ♦6 (3-0).
HIST 660. *The United States.* ♦6 (3-0).
HIST 670. *Canada.* ♦6 (3-0).
HIST 680. *East Asia.* ♦6 (3-0).

## 44.19 / *Household Economics*

School of Household Economics.

H EC 352. *Applied Art.* ♦6 (3-0). The principles and elements of design; selection and arrangement of materials and objects in the home; analysis of house plans. Historic styles of architecture and furniture and their relationship to contemporary design.

## 44.20 / *Interdepartmental Courses*

Courses listed hereunder are the concern of more than one discipline. Students may register in these courses either as options or as courses in subjects of concentration in one of the disciplines listed in the footnote under each course, subject to the usual curriculum requirements, prerequisites, etc. Instruction will be offered by members of one or more of the departments listed beneath the course description.

INTER D 305. *Culture and Language.* ♦6 (3-0). The nature of human communication, its cultural conditions and consequences. Special attention to the interrelations of the linguistic structures and habitual modes of behavior and thought of various societies. Note: Formerly ANTHRO/LING 305.
INTER D 356. *Sociology of Rural Life.* ♦3 (either term, 3-0). The rural community and rural social systems, with special reference to changes in the rural way of life. Prerequisite: Sociology 202 or 403 or consent of the Department. Note: Formerly SOC/RURAL SOC 356.
INTER D 367. *Economics of Agriculture.* ♦3 (First Term, 3-0). An introduction to the nature and scope of agricultural economics; economic aspects of agricultural production, marketing, finance, resource use, prices, and policy; relation of the agricultural sector to the economy as a whole; analysis of structural change, economic growth and adjustment in agriculture. Prerequisite: Economics 200. Note: Formerly AG EC/ECON 367.
INTER D 368. *Economics of World Agriculture.* ♦3 (Second Term, 3-0). A survey of world structure of agricultural production, consumption, and trade; international agricultural policies and agreements; impact of regional economic integration on agriculture; interrelation of economic development and trade in agricultural commodities. Prerequisite: Economics 200. Note: Formerly AG EC/ECON 368
INTER D 374. *Contrastive Analysis of Russian and English.* ♦6 (3-0). Contrastive analysis of the phonological and morphological systems of contemporary Standard Russian and Modern Eng-

lish. The graphemic systems and syntactical patterns of Russian and English. Prerequisite or corequisite: Russian 300. Note: Formerly RUSS/LING 374.

INTER D 393. *Political Sociology.* ♦6 (3-0). The social basis of political institutions and practices, and the impact of these institutions and practices on society. Prerequisite: Political Science 200 or Sociology 202 or 403 or consent of the Department. Note: Formerly POL SC/SOC 393.

INTER D 395. *Prehistoric Archaeology.* ♦6 (3-0). Archaeology as the anthropological approach to reconstruction and study of non-literate societies of the past; survey of archaeological techniques, methods, and modes of interpretation; survey of world pre-history. Prerequisite: Anthropology 202 or Classics 356, or consent of the Department. Note: Formerly ANTHRO/CLASSICS 395.

INTER D 416. *Anthropology and Education.* ♦6 (3-0). The nature of anthropology and its relationships to education. The transmission of culture in different societies, with reference to special Canadian communities. Prerequisite: A basic course in Anthropology or Sociology or consent of the Department. Note: Formerly ANTHRO/ED FDN 416.

INTER D 456. *Rural Social Problems and Public Policy.* ♦3 (First Term, 3-0). Social problems in Canadian rural life; analysis of policy making processes related to these problems. Prerequisite: Sociology 202 or 403 or consent of the Department. Note: Formerly SOC/RURAL SOC 456.

INTER D 458. *Agrarian Social Movements.* ♦3 (Second Term, 3-0). A sociological analysis of major agrarian social movements in North America. Prerequisite: Sociology 202 or 403 or consent of the Department. Note: Formerly SOC/RURAL SOC 458.

INTER D 459. *Sociology of Community Development.* ♦6 (3-0). Human communities; their institutional structure, ecological factors associated with patterns of growth, community relations, community planning and community development. Prerequisite: Sociology 202 or 403 or consent of the Department. Note: Formerly SOC/RURAL SOC 459.

INTER D 470. *American Indian Linguistics.* ♦6 (3-0). The large genetic groupings, their structural characteristics in descriptive and historical perspective; problems of classification; the use of non-linguistic evidence for linguistic pre-history. Prerequisite: Linguistics 350. Note: Formerly ANTHRO/LING 470.

INTER D 546. *Soviet and East European Studies.* ♦6 (3-0). An interdisciplinary seminar. Note: Formerly ECON/GEOG/HISTORY/POL SC/SLAV 546.

INTER D 574. *Seminar in Philosophy and Psychology.* ♦2 (2-0). Fundamental methodological, conceptual, and philosophical issues in psychology. Prerequisite: Advanced standing in Philosophy or Psychology. Note: Formerly PHIL/PSYCH 574.

## 44.21 / *Interdisciplinary Studies*

INT ST 500. *Nature of Man.* ♦6 (3-0). A seminar comparing the various conceptions of the nature of man held by sociologists, psychologists, biologists, philosophers, theologians, writers and artists, and exploring some of the major social and philosophical issues which confront man today from the perspectives of these disciplines.

## 44.22 / *Italian*

Department of Romance Languages

### 44.22.1 / JUNIOR COURSES

ITAL 100. *Beginners' Italian.* ♦6 (3-2). Italian grammar and pronunciation. Readings of easy texts dealing with different aspects of Italian culture.

ITAL 200. *First Year University Italian.* ♦6 (3-0). Designed for students having some previous knowledge of Italian.

ITAL 201. *Second Year Honors Laboratory Hour.* ♦2 (0-1).

### 44.22.2 / SENIOR COURSES

ITAL 300. *Second Year Italian.* ♦6 (3-0). Selected contemporary prose and poetry. Advanced grammar and phonetics. Prerequisite: Italian 100.

ITAL 302. *Third Year Honors Language Seminar.* ♦2 (1-0).

ITAL 320. *Contemporary Italian Novel.* ♦6 (3-0). Moravia, Vittorini, Pavese, Bassano, Cassola, Calvino, Pasolini. Prerequisite: Italian 200 or Italian 300; or corequisite Italian 300.

ITAL 330. *The "Novella".* ♦6 (3-0). From Boccaccio's *Decameron* to Pirandello's *Novella per un anno.* Prerequisite or corequisite: Italian 320.

ITAL 340. *A Survey of Italian Literature.* ♦6 (3-0). Major literary works from the Sicilian school to the present.

ITAL 350. *Italian Literature in English Translation.* ♦6 (3-0). The origins of the sonnet and the *canzone;* Dante's *Divine Comedy;* the works of Petrarch; the lyric madrigal; the early novelists from Boccaccio to Masuccio; new concepts of drama: *commedia dell' arte, commedia erudita,* and early opera texts; Platonist writers and the arts: Ficino, Leonardo da Vinci, Michelangelo; the Renaissance epic of Ariosto and Tasso; Marinismo and the Baroque.

ITAL 360. *The Italian Theatre.* ♦6 (3-0). Selected plays by Machiavelli, Ruzzante, Della Valle, Metastasio, Goldoni, Alfieri, Manzoni and Pirandello. Prerequisite: Italian 300, or corequisite: Italian 330.

ITAL 375. *The Nineteenth Century Novel.* ♦6 (3-0). Manzoni, Nievo, Fogazzaro, Verga, D'Annunzio, etc. Prerequisite: Italian 300 or corequisite: Italian 330.

ITAL 400. *Renaissance Prose.* ♦6 (3-0). Machiavelli's Prince, Castiglione's *Courtier,* Della Casa's *Galateo,* Cellini's *Autobiography,* Vasari's *Lives,* etc.

ITAL 410. *Heroic and Mock-Heroic Epic.* ♦6 (3-0). Pulci, Boiardo, Ariosto, Tasso.

ITAL 420. *Renaissance Theatre.* ♦6 (3-0). *La commedia del* '500; *La Pastorale;* the beginning of *Melodramma.*

### 44.22.3 / HONORS AND GRADUATE COURSES

ITAL 500. *Contemporary Italian Literary Aesthetics.* ♦6 (3-0). Croce's aesthetics. Marxist criticism—Gramsci and G. della Volpe. Prerequisite: Two senior Italian courses.

ITAL 510. *Literary Movements of the Twentieth Century.* ♦6 (3-0). A critical reading of the major periodicals of the first half of the century: *La Ronda, La Voce, La Critica,* etc.

ITAL 699. *Conference Course.* A detailed study of some great author or question not dealt with in the other honors or graduate courses. Designed to meet the needs of individual honors or graduate students.

## 44.23 / *Latin*

Department of Classics

### 44.23.1 / JUNIOR COURSES

LATIN 100. *Beginners' Latin.* ♦6 (5-0). Essentials of grammar, syntax, the reading of easy Latin and prose composition. Secondary emphasis on the connexion of English with Latin.

LATIN 200. *Latin Authors.* ♦6 (3-0). Practice in the reading of Latin and with the writing of simple Latin sentences. Note: For students with matriculation in Latin 30 or with Latin 100.

### 44.23.2 / SENIOR COURSES

LATIN 300. *Latin Authors and Prose Composition.* ♦6 (3-0). Sight translation and principles of language. For students proceeding from Latin 200.

LATIN 311. *Elementary Composition.* ♦2 (1-0) Principles of grammar and the writing of Latin sentences. Corequisite: Latin 300. Note: Primarily for Honors students.

LATIN 372. *Livy, Vergil and Pliny.* ♦6 (3-0). Selections from Livy, *History of Rome;* Vergil, *Aeneid* and Pliny, *Letters.*

LATIN 373. *Horace, Tacitus and Juvenal.* ♦6 (3-0). Horace, *Satires;* Tacitus, *Annals,* I-IV; Juvenal, *Satires.*

LATIN 374. *Cicero, Horace, Sallust.* ♦6 (3-0). Cicero, *Pro Lege Manilia;* Horace, *Odes;* Sallust, *Catilina.*

LATIN 375. *Plautus, Terence, Vergil.* ♦6 (3-0). Plautus, *Menaechmi;* Terence, *Adelphoe;* Vergil, *Aeneid,* Book VI.

LATIN 411. *Intermediate Composition.* ♦2 (1-0). The writing of Latin prose. Corequisite: One of Latin 372, 373, 374 or 375. Note: Primarily for honors students.

### 44.23.3 / HONORS AND GRADUATE COURSES

LATIN 501. *Cicero.* ♦6 (3-0).

LATIN 502. *Roman Comedy.* ♦6 (3-0).

LATIN 503. *Epic and Didactic Poetry.* ♦6 (3-0).

LATIN 505. *Vergil, Complete Works.* ♦6 (3-0).

LATIN 506. *Sanskrit.* ♦6 (3-0).

LATIN 507. *Petronius, Apuleius.* ♦6 (3-0).

LATIN 508. *Tacitus.* ♦6 (3-0).

LATIN 509. *Roman Elegiac Poets.* ♦6 (3-0).

LATIN 510. *Roman Satire.* ♦6 (3-0).

LATIN 511. *Advanced Latin Prose Composition.* ♦2 (1-0).

LATIN 513. *Latin Lyric Poetry.* ♦6 (3-0).

LATIN 517. *Studies in Latin Literature.* ♦6 (3-0).

LATIN 531. *History of the Latin Language.* ♦3 (either term, 3-0).

LATIN 532. *Latin Epigraphy.* ♦3 (either term, 3-0).

LATIN 533. *Latin Palaeography.* ♦3 (either term, 3-0).

LATIN 534. *Medieval Latin.* ♦3 (either term, 3-0).

LATIN 621. *Advanced Latin Palaeography.* ♦6 (3-0). Prerequisite: Latin 533.

## 44.24 / *Linguistics*

### 44.24.1 / SENIOR COURSES

LING 305. *Culture and Language.* See INTER D 305.

LING 350. *General Linguistics.* ♦6 (3-0). Introduction to the study of language in its structural and historical aspects. Examples from modern European languages.

LING 370. *Contrastive Linguistics: French and English.* ♦6 (310). An analytical study of the French and English languages, comparing and contrasting their linguistic structure, i.e. phonetics, phonemics, morphology, syntactical patterns, and lexicology. Practical work in oral recognition and phonetic transcription. Prerequisites: French 200 and Linguistics 350 or French 330.

LING 372. *Contrastive Linguistics: German and English.* ♦6 (3-0). An analytical study of the German and English languages, comparing and contrasting their linguistic structure, i.e. phonetics, phonemics, morphology, syntactical patterns, and lexicology. Practical work in oral recognition and phonetic transcription. Prerequisites: German 200 and Linguistics 350.

LING 374. *Contrastive Analysis of Russian and English.* (See INTER D 374).

LING 387. *Linguistic Geography.* ♦6 (3-0). Principles of linguistic geography. Examples largely from varieties of North American English.

LING 389. *Modern English Grammar.* ♦6 (3-0). A contrastive study of several analyses of Modern English grammar: traditional, structural and transformational.

LING 405. *Applied Linguistics.* ♦6 (3-0). Application of structural linguistics to second language learning, and its relationship to various ancillary areas. Prerequisites: Linguistics 350 and Linguistics 389 or equivalent.

LING 455. *Descriptive Linguistics.* ♦6 (3-0). Methods of analysing and describing linguistic structure. Problems from a variety of languages, including the indigenous languages of North America. Prerequisite: Linguistics 350.

LING 465. *Historical Linguistics.* ♦6 (3-0). Linguistic change. Methods of reconstruction of earlier stages of language through the comparison of existing languages and through the examination of written records. Genealogical and typological bases for classifying languages. Particular emphasis on the Indo-European language family Prerequisite: Linguistics 350.

LING 470. *American Indian Linguistics.* See INTER D 470.

LING 507. *Selected Topics in English Grammar.* ♦6 (3-0). Prerequisite: Linguistics 350 and 398.

LING 550. *Advanced Phonetics and Field Methods.* ♦6 (3-0). Phonetic theory; practical phonetics; recording techniques and methods of analysis illustrated by the study of an American Indian language or Eskimo. Native informants and recorded material will be used. Prerequisite: Linguistics 455.

LING 565. *Pidgins and Creoles.* ♦6 (3-0). Prerequisite: Linguistics 350 and two other Linguistic courses.

LING 575. *Languages of Mexico and South America.* ♦3 (Second Term, 3-0). Prerequisite or corequisite: Linguistics 470.

LING 650. *Studies in American Indian Languages.* ♦6 (3-0). Prerequisite: Linguistics 470.

LING 660. *Studies in Applied Linguistics.* ♦6 (3-0). Prerequisite: Linguistics 405.

LING 670. *Intensive Language.* ♦4 (2-4). Prerequisites: Linguistics 350 and two other courses in Linguistics, or consent of the Department.

LING 685. *Language Typology.* ♦6 (3-0). Prerequisites: Linguistics 350 and two other Linguistics courses.

LING 690. *Models of Language.* ♦6 (3-0). Prerequisite: Linguistics 455.

LING 693. *Seminar in Computational Linguistics.* ♦6 (3-0). Prerequisites: Linguistics 350 and consent of the Department.

LING 695. *Transformational Grammar.* ♦6 (3-0).

LING 697. *Seminar in Linguistic Theories.* ♦6 (3-0). Prerequisite: Consent of the Department.

LING 699. *Conference Course.* Designed to meet the needs of individual honors or graduate students.

## 44.25 / *Music*

### 44.25.1 / JUNIOR COURSES

MUSIC 202. *Classical and Romantic Music.* ♦4 (2-2). Styles and forms from the sons of Bach through early Beethoven. The transition to Romanticism. Forms and styles of the Romantic era. The sonata, symphony, chamber music, opera, music drama, lieder, concerto, symphonic poem.

MUSIC 205. *Introduction to Concert Music.* ♦6 (3-1). The history and appreciation of concert music. Composers, styles, and musical forms of the standard repertory. Attendance at prescribed concerts and rehearsals will be arranged.

MUSIC 210. *Foundations of Music.* ♦4 (2-3). The development of a musical repertory and knowledge of basic content appropriate for teachers. Note: Open only to B.Ed. students.

MUSIC 213. *Choral Technique and Interpretation.* ♦6 (3-0). Elementary theory and practice of singing, choral technique and interpretation, sight singing and ear training. Prerequisite: (i) Western Board of Music Grade III theory or equivalent, and (ii) Western Board of Music Grade V practical or equivalent.

MUSIC 215. *Second Practical Subject.* ♦2 (1-0). Note: Required by candidates in the first year of the B.Mus. program and restricted to these students.

MUSIC 225. *First Practical Subject.* ♦6 (2-0). Note: Required by candidates in the first year of the B.Mus. program and restricted to these students.

MUSIC 229. *Chamber Music.* ♦1 (1L). Note: Required of all orchestral instrument majors in the Applied Music route.

MUSIC 250. *Elementary Harmony.* ♦4 (2-1). Diatonic harmony, including secondary sevenths. Modulation. Use of unessential notes of all kinds. Harmonizing of chorales in the style of Bach. Form; ear training; sight singing; keyboard harmony. Corequisite: Music 260.

MUSIC 260. *Theory Laboratory.* ♦2 (2L). Traditional compositional styles and techniques. Note: Required of all B.Mus. Theory major students and a corequisite of Music 250.

### 44.25.2 / SENIOR COURSES

MUSIC 302. *Medieval, Renaissance and Baroque Music.* ♦6 (3-2). Music of the early Christian Church. The Mass, plainsong, the development of notation. The Troubadour movement. The development of polyphony through organum, clausula, and motet. Sacred and secular forms of the Renaissance. Schools of the fifteenth and sixteenth centuries. The beginnings of instrumental styles and forms. New concepts and forms in the Baroque. The development of Opera and Oratorio. Prerequisite: Consent of the Department.

MUSIC 304. *Instrumental Technique-Brass, Woodwind and Percussion.* ♦3 (3L). A laboratory in the principles and styles of brass, woodwind, and percussion instruments. Note: Required in the second year of the B.Mus. programs in Theory and Composition and Music History and Literature. Not for credit in the B.A. program.

MUSIC 305. *Musical Literature for Children.* ♦3 (First Term, 3-0). Survey, selection, and use of recorded materials, films, film strips, and books about music and musicians. Prerequisite: ED CI 213 or permission of the Department. Note: Limited to students in the Faculty of Education.

MUSIC 307. *Instruments for Children.* ♦3 (Second Term, 3-0). Laboratory experience with recorder ensemble, small winds, chording, and percussion instruments. Note: Limited to students in the Faculty of Education.

MUSIC 311. *Band and Orchestra.* ♦6 (6L). Practical instruction in all string, woodwind, brass and percussion instruments. Note: An intensive course intended only for persons already competent in theoretical and practical music.

MUSIC 312. *Collegium Musicum.* ♦2 (1-0). Preparation and performance of vocal and instrumental music from medieval to classical times. Closely associated with the content of Music 302; emphasis on the performance of early music, with a minimum of verbal instruction. Note: Required for all second-year B.Mus. students and open to other students with permission of the Department. Students will be expected to perform on any instrument on which they have proficiency, as well as to take part in a wide variety of vocal combinations and styles.

MUSIC 315. *Second Practical Subject.* ♦2 (1-0). Note: Required by candidates in the second year of the B.Mus. program and restricted to these students.

MUSIC 325. *First Practical Subject.* ♦4 (2-0). Note: Required by candidates in the second year of the B.Mus. program and restricted to these students.

MUSIC 329. *Chamber Music.* ♦1 (1L). Note: Required of all orchestral instrument majors in the Applied Music route.

MUSIC 332. *Hymnology.* ♦6 (3-0). History of the hymn and hymn tune; types of hymns and their uses; analysis and interpretation of hymns; evaluation of standard hymnals. Note: Acceptable as an option in the general B.A. program.

MUSIC 350. *Harmony.* ♦6 (2-3). Chromatic harmony in four parts. Ear training, sight singing and keyboard harmony, harmonic analysis. Prerequisite: Music 250.

MUSIC 352. *Counterpoint.* ♦4 (2-0). Free counterpoint in two and three parts. Elementary canonic writing. Setting of simple texts. The writing of two-part inventions.

MUSIC 360. *Composition.* ♦2 (2-0). A sequent course to Music 260 and a corequisite of Music 350 with emphasis on the study of, and writing in, untraditional styles of the twentieth century. Note: Required of all B.Mus. Theory major students.

MUSIC 361. *Form and Analysis.* ♦4 (2-0). The structure of phrase and sentence. The binary and ternary forms, minuet and trio, rondo, sonata, canon, and fugue. The cyclic forms, sonata and suite, and their components. Structural analysis of instrumental and vocal forms of the late Baroque, Classical and Romantic periods.

MUSIC 402. *Twentieth Century Music.* ♦6 (3-2). Styles and techniques of composers from Debussy to the present. Prerequisite: Music 202 and Music 302 or their equivalent.

MUSIC 404. *Instrumental Technique—Strings.* ♦4 (3L). A laboratory in the principles and practice of stringed instruments. Note: Required in the third year of the B.Mus. program in Theory and Composition and Music History and Literature. Not for credit in the B.A. program.

MUSIC 410. *Music of the Baroque.* ♦6 (3-0). Styles, forms, and literature of the Baroque era (1600-1750).

MUSIC 411. *Arranging.* ♦3 (either term, 3-0). Practical instruction in arranging for instrumental groups of limited experience. Prerequisite: Music 311 and Music 250, or consent of the Department.

MUSIC 415. *Second Practical Subject.* ♦2 (1-0). Note: Required by candidates in the third year of the B.Mus. program and restricted to these students.

MUSIC 425. *First Practical Subject.* ♦6 (2-0). Note: Required by candidates in the third year of the B.Mus. program and restricted to these students.

MUSIC 427. *Literature and Pedagogy.* ♦4 (2-1). Note: Required of piano students in the third year of the B.Mus. program in Applied Music, and restricted to them.

MUSIC 428. *Vocal Accompanying.* ♦2 (1L). Representative works and styles of the vocal repertoire. Special emphasis on German Lieder—Schubert, Schumann, Brahms, Wolf, R. Strauss; French art songs—Duparc, Fauré, Debussy, Ravel. Students will be regularly assigned repertoire, with accompanists required to read at sight and to transpose up and down a minor and major second. Knowledge of pronunciation and general translation of texts required. Note: Required of voice majors and piano majors in the third year of the B.Mus. program in Applied Music.

MUSIC 429. *Chamber Music.* ♦1 (1L). Note: Required of all piano majors and orchestral instrument majors in the Applied Music route.

MUSIC 432. *Music of the Great Liturgies.* ♦6 (3-0). Comparison of the Jewish, Eastern Orthodox, Catholic, Lutheran, and Protestant Episcopal liturgies and their music; relation to music in the non-liturgical service; the church year.

MUSIC 444. *Conducting.* ♦3 (either term, 3-0). Practical instruction for the teacher-conductor dealing with developing instrumental groups. Prerequisite: Music 311 or consent of the Department.

MUSIC 450. *Advanced Chromatic Harmony.* ♦6 (2-2). Writing for various instruments; the setting of words. Keyboard harmony; score reading: analytical techniques. Prerequisite: Music 350.

MUSIC 452. *Counterpoint.* ♦4 (2-0). Continuation of three-voiced counterpoint, vocal and instrumental styles. Introduction to four-voiced counterpoint. Ground bass, round, invertible counterpoint at octave and fifteenth. Canons at any interval. Elements of fugue. The Three-Part Invention.

MUSIC 460. *Composition.* ♦2 (2-0). A sequent course to Music 360 and a co-requisite to Music 450, with emphasis on the study of, and writing in, larger forms. Note: Required of all B.Mus. Theory major students.

MUSIC 461. *Orchestration.* ♦4 (2-0). The instruments of the orchestra; ranges, tonal qualities, technical peculiarities, tuning and transposition. Problems of bowing and articulation as applied to orchestration. Transcription from piano score for strings, woodwind, and brass combinations. Note: Required in the three areas of study of the B.Mus. program.

MUSIC 500. *Music Literature Seminar.* ♦6 (3s-0). The analysis and preparation of musical materials for presentation to music literature classes. Note: Open to holders of the B.Ed. degree with a major in music.

MUSIC 510. *Notation of Medieval Music.* ♦4 (2-0). Development of notation through the various schools of neume notation, Gregorian notation, Troubadour, early polyphonic, modal notation, the Franconian system, and the period of Ars Nova. The transcription of facsimiles.

MUSIC 520. *Notation of Renaissance Music.* ♦4 (2-0). A sequent course to Music 510. Tablature and keyboard notation, proportional notation, white notation of the fifteenth and sixteenth centuries. The transcription of facsimiles.

MUSIC 525. *First Practical Subject.* ♦6 (2-0). Note: Required of students in the fourth year of the Bachelor of Music programs in Applied Music and Music History and Literature and restricted to them.

MUSIC 527. *Literature and Pedagogy.* ♦4 (2-1). Note: Required in the fourth year of the B.Mus. program by piano candidates in Applied Music and restricted to them.

MUSIC 528. *Choral and Organ Literature.* ♦4 (2-0).

MUSIC 529. *Chamber Music.* 1 (1L). Note: Required of all piano majors and orchestral instrument majors in the Applied Music route.

MUSIC 532. *Music in the Western Church.* ♦6 (3-0). The nature of worship; music as an aid to worship; kinds of service music; orders of worship; congregational participation; responsibilities of director, organist, and choir; evaluating service music.

MUSIC 552. *Counterpoint.* 4 (2-0). Sixteenth century counterpoint. The writing of motets and madrigals up to four parts. Some four-part setting of texts in eighteenth and nineteenth century styles.

MUSIC 553. *Advanced Harmony and Fugue.* ♦4 (2-0). Analytical study of important works of the Romantic period including Richard Strauss. Four- and five-part harmony. Analytical study of fugues from pre-Bach up to and including the twentieth century. Creative writing including use of all contrapuntal devices. The writing of an entire fugue.

MUSIC 554. *Score Reading and Orchestral Literature.* ♦4 (2-0). Score reading at and away from the keyboard. The classical string quartet and orchestra. Orchestral literature from Haydn to the present day.

MUSIC 555. *Conducting.* ♦4 (2-0). Conducting of choirs and instrumental groups. Similarities and differences in conducting choral and instrumental groups of varying sizes and accomplishments.

MUSIC 560. *Composition.* ♦6 (2-0). A sequent course to Music 460 and a corequisite to Music 553, with emphasis on the study of, and writing for, larger groups of voices and instruments. Note: Required of all B.Mus. Theory major and Composition major students.

MUSIC 561. *Orchestration.* ♦4 (2-0). Ranges, tonal qualities, technical peculiarities relating to percussion instruments, and the less common wind instruments of the orchestra. Scoring for small groups and for Symphony orchestra. Prerequisite: Music 461. Note: Required in the third year of the B.Mus. program in Theory and Composition and Music History and Literature.

MUSIC 570. *Aural Theory.* ♦4 (2-0). Sight singing in Treble, Bass and C clefs including chromaticism, advance modulation, rhythmic and intervallic problems, with materials from twentieth century vocal and choral literature. Harmonic dictation up to four parts including all traditional chromatic triads and sevenths and both elementary and advanced modulation. Contrapuntal dictation in two voices in twentieth century style. Special exercises in listening: detection of melodic, chordal, and rhythmic errors in keyboard music of relative difficulty.

MUSIC 571. *Choral and Band Arranging.* ♦4 (2-0). (i) Choral—Scoring for two, three, and four parts music which would be useful for groups of various levels of achievement. Adaptation and/or reduction from standard major works, i.e. oratorios and cantatas, for any of these groups. The use of suitable piano accompaniments if required. (ii) Band—For small groups (chamber groups), brass choir, full band; arrangements made from standard keyboard literature from the sixteenth century to the present, ranging in difficulty from elementary to advanced. Transcription of excerpts from orchestral literature of moderate difficulty for full band.

MUSIC 602. *History of Music Theory.* ♦6 (2-0).

MUSIC 610. *Seminar in Music History and Literature.* ♦6 (2-0).

MUSIC 612. *Collegium Musicum.* ♦2 (1-0).

MUSIC 625. *First Practical Subject.* ♦6 (2-0).

MUSIC 627. *Pedagogy of Music Theory.* ♦6 (2-0).

MUSIC 629. *Ensemble.* ♦3 (2L).

MUSIC 650. *Analysis of Twentieth Century Harmony.* ♦6 (2-0).

## 44.26 / *Old and New Testament Literature*

St. Stephen's College

O & N T L 351. *Old and New Testament Literature.* ♦6 (3-0). Historical background, authorship, sources, literary qualities, and general teaching of the various books and groups of books in the Old Testament. Jewish literature subsequent to the Old Testament canon; the Jewish and Hellenistic environment; the occasion, authorship, and content of the various books of the New Testament; growth of the canon; history of the text.

## 44.27 / *Philosophy*

### 44.27.1 / JUNIOR COURSES

PHIL 240. *Introduction to Western Philosophy.* ♦6 (3-0). An introduction to the main problems and theories that have dominated philosophical thought in the Western world, through study and discussion of selected philosophical classics. Emphasis upon both a sound acquaintance with the main outlines of our philosophical tradition and the ability to handle philosophical ideas independently.

PHIL 242. *Foundations and Development of Christian Philosophy.* ♦6 (3-0). Main ideas and currents of Western philosophy from its beginnings in the creative period of Greek thought to the present. Selected ideas and problems examined in the writings of significant Western philosophers. Note: Offered by St. Joseph's College, and accepted as an alternative to Philosophy 240.

PHIL 250. *Introduction to Logic.* ♦6 (3-0). The techniques of formal and informal logic, and of scientific method; the detection of fallacies in arguments; the notion of validity in deductive arguments, with a discussion of both traditional in the logic of science. Designed to show how to appraise arguments logically.

### 44.27.2 / SENIOR COURSES

PHIL 310. *Philosophy of Civilization.* ♦6 (3-0). Definition and examination of the concept of civilization, designed to satisfy the need to comprehend human culture as a whole and to provide a conceptual framework within which national, regional, and ideological differences can be discussed rationally.

PHIL 320. *Introduction to Indian and Chinese Philosophy.* ♦6 (3-0). First Term: Indian philosophy, with special attention to Indian religious thought. Second Term: Chinese philosophy, with special attention to Chinese ethical thought. Prerequisite: Philosophy 240.

PHIL 330. *The Philosophy of Man.* ♦6 (3-0). A philosophical study of man in himself, in his operations of knowing and loving, in the perfection of his actions through the development of habits, and in his domestic, community, and political environments. Related readings from Plato, Aristotle, Augustine, Thomas Aquinas, Locke, J. S. Mill, Dewey, Maritian, Ryle, Austin, and others. Note: Offered by St. Joseph's College, and accepted by the Faculty of Arts as an Arts option for Roman Catholic students only.

PHIL 341. *Greek Philosophy.* ♦3 (First Term, 3-0). Prerequisite: Philosophy 240 or 242, or consent of the Department.

PHIL 343. *Medieval Philosophy.* ♦3 (Second Term, 3-0). Prerequisite: Philosophy 240 or 242, or consent of the Department.

PHIL 345. *Philosophy from Descartes to Kant.* ♦3 (First Term, 3-0). Prerequisite: Philosophy 240 or 242, or consent of the Department.

PHIL 346. *Medieval Philosophy.* ♦6 (3-0). See St. Joseph's College, § 246.3.3.

PHIL 347. *Philosophy from Kant to Russell.* ♦3 (Second Term, 3-0). Prerequisite: Philosophy 240 or 242, or consent of the Department.

PHIL 350. *Aesthetics.* ♦6 (3-0). An inquiry into the nature and justification of standards of art and beauty.

PHIL 352. *Social Philosophy.* ♦6 (3-0). A philosophical and synoptic study of the nature of society.

PHIL 354. *Ethics.* ♦6 (3-0). An inquiry into the nature and justification of moral standards.

PHIL 358. *Philosophy of Religion.* ♦6 (3-0). A philosophical examination of the fundamental concepts of religious thinking. Prerequisite: A previous course in Philosophy or consent of the Department.

PHIL 360. *Symbolic Logic.* ♦6 (3-0). An introduction to the logic of both natural and artificial languages, emphasizing logical features such as inference, deduction, substitution, and satisfiability. A symbolic deductive system governed only by explicit rules will be constructed and its properties examined.

PHIL 364. *Philosophy of Science.* ♦6 (3-0).

PHIL 366. *Metaphysics.* ♦6 (3-0). A critical examination of the problems and techniques of metaphysics from Aristotle to Heidegger. Prerequisite: Philosophy 240 or 242.

PHIL 420. *Problems of Philosophy.* ♦6 (3-0). Individually supervised research in an area of special interest. Note: Required of all fourth-year honors students.

PHIL 440. *Philosophy of Language.* ♦6 (3-0). Theories of meaning developed since the Vienna Circle's suggestion that metaphysics is meaningless and Wittgenstein's claim that philosophical problems arise when language is not functioning but idling. Philosophers discussed include Frege, Ayer, Russell, Wittgenstein, Carnap, and Quine. Prerequisite: Philosophy 341.

PHIL 441. *Hume and Kant.* ♦3 (Second Term, 3-0). A critical examination of their epistemological and moral positions. Prerequisite: Philosophy 345.

PHIL 442. *Nineteenth-Century Philosophy.* ♦6 (3-0). Main philosophical movements in the nineteenth century: the post-Hegelian reaction against metaphysical idealism in Germany; British idealism, and American pragmatism. Philosophers discussed include Schopenhauer, Nietzsche, Bradley, and Peirce. Prerequisite: Philosophy 341.

PHIL 444. *Modern Analytical Philosophy.* ♦6 (3-0). A discussion of some of the more important analytical writings, with special reference to topics in the philosophy of mind and the philosophy of language and to the work of Wittgenstein, Ryle, and Austin. Prerequisite: Philosophy 341 or consent of the Department.

PHIL 450. *Advanced Aesthetics.* ♦6 (3-0). Current attempts to delineate the epistemological foundations of aesthetic theory. Prerequisite: Philosophy 350. The course presupposes a general awareness of the major issues in epistemology as well as in aesthetics.

PHIL 452. *Greek Ethics.* ♦6 (3-0). A survey of the development of Greek ethical theory from Homeric to Hellenistic Greece, and the relevance of the views put forward to present day problems in moral philosophy. Prerequisite: Philosophy 240, Philosophy 345 or 354 or Classics 350.

PHIL 454. *Advanced Ethics.* ♦6 (3-0). Central works in the history of moral philosophy and selections from modern writers on the nature of morality and the role of moral philosophy. Basic problems discussed are: the nature of moral principles, judgments, reasons, obligations, and rights. Philosophers discussed include Aristotle, Kant, Hume, Bradley, Moore, and Prichard. Prerequisite: Philosophy 354 or consent of the Department.

PHIL 456. *Advanced Social and Political Philosophy.* ♦6 (3-0). Basic concepts used in social and political discourse; methods and techniques of social and political science. Prerequisite: Philosophy 352 or 354.

PHIL 457. *Philosophy of Religion.* ♦3 (Second Term, 3-0). Philosophical issues in contemporary philosophy of religion and theology. Prerequisite: Philosophy 358, or consent of the Department.

PHIL 459. *Plato.* ♦3 (Second Term, 3-0). The development of Plato's epistemology. Prerequisite: Philosophy 341 or 345, or consent of the Department.

PHIL 461. *Aristotle.* ♦3 (First Term, 3-0). Aristotle's metaphysical philosophy, especially his concept of substance; the development of his doctrine; comparison with other philosophers who have attempted similar ontological analyses.

PHIL 462. *Philosophy of Science.* ♦6 (3-0). Prerequisite: Consent of the Department.

PHIL 464. *Existentialism.* ♦6 (3-0). The Existentialist approach; technical contributions to epistomology, ontology, and ethics made by such writers as Kierkegaard, Heidegger, Jaspers, and Sartre; comparison of Existentialism with German Idealism and German and French Phenomenology as well as with varieties of modern analytically-orientated philosophy. Prerequisite: Philosophy 240 or consent of the Department.

PHIL 465. *Theory of Knowledge.* ♦3 (First Term, 3-0). Problems discussed in current works on the theory of knowledge. Prerequisite: Philosophy 240 or 242.

PHIL 468. *Philosophy of Mind.* ♦6 (3-0). Topics include the problems characterizing mental phenomena, the relation of minds and bodies; knowledge of other minds, issues in the explanation of behavior, the relevance of cybernetics to the discussion of mental phenomena. Prerequisite: A previous course in Philosophy.

### 44.27.3 / HONORS AND GRADUATE COURSES

PHIL 502. *Plato.* ♦6 (3-0).
PHIL 504. *Aristotle.* ♦6 (3-0).
PHIL 506. *St. Thomas Aquinas.* ♦6 (3-0).
PHIL 510. *Hegel.* ♦6 (3-0).
PHIL 512. *Marx and Marxism.* ♦6 (3-0).
PHIL 514. *Kierkegaard.* ♦6 (3-0).
PHIL 516. *Wittgenstein.* ♦6 (3-0).
PHIL 520. *Problems in Philosophy.* ♦6 (3-0).
PHIL 522. *Moral Philosophy.* ♦6 (3-0).
PHIL 524. *Political and Social Philosophy.* ♦6 (3-0).
PHIL 526. *Philosophy of Art.* ♦6 (3-0).
PHIL 528. *Philosophy of History.* ♦6 (3-0).
PHIL 536. *Contemporary Phenomenology .*♦6 (3-0).
PHIL 548. *Conference Course.* ♦6 (3-0).
PHIL 554. *Theory of Value.* ♦6 (3-0).
PHIL 556. *The Philosophy of Kant.* ♦6 (3-0).
PHIL 558. *The Philosophy of Religion.* ♦6 (3-0).
PHIL 560. *Logic.* ♦6 (3-0).
PHIL 566. *Theory of Knowledge.* ♦6 (3-0).
PHIL 568. *Philosophy of Mind.* ♦6 (3-0).
PHIL 570. *Philosophy of Language.* ♦6 (3-0).
PHIL 596. *Seminar for Honors Philosophy Students in Third Year.* ♦2 (1-0).
PHIL 598. *Seminar for Honors Philosophy Students in Fourth Year.* ♦2 (1-0).
PHIL 678. *Reading Course.* ♦6 (3-0). Note: Open only to provisional candidates for the Ph.D.
PHIL 679. *Research Seminar.* ♦4 (2-0). Note: Required of all graduate students beyond the Qualifying year.

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## 44.28 / *Physical Education*

Faculty of Physical Education

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P ED 218. *Activity Course — Men.* ♦1 (0-2). Tests in fitness and aquatics in the First Term, followed by student-selected recreational activities. Note: Course required of all first-year men.

P ED 228. *Activity Course — Women.* ♦1 (0-2). Foundations of Physical Education with emphasis on fitness, followed by two electives in recreational activities. Note: Course required of all first-year women.

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## 44.29 / *Polish*

Department of Slavonic Languages

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### 44.29.1 / JUNIOR COURSES

POLSH 100. *Beginners' Polish.* ♦6 (3-2). Essentials of grammar, reading and drill on useful expressions designed to give a working knowledge of the Polish language.

POLSH 201. *Practical Study of the Polish Language.* ♦2 (0-1). Second year Honors laboratory hour.

### 44.29.2 / SENIOR COURSES

POLSH 300. *Second Year Polish.* ♦6 (3-0). Advanced Polish grammar, composition, and oral practice based on selected texts of Polish classical and contemporary literature. Prerequisite: Polish 100 or consent of the Department.

POLSH 302. *Practical Study of the Polish Language.* ♦2 (0-1). Third year Honors laboratory hour.

POLSH 360. *Survey of Polish Literature.* ♦6 (3-0). Selected periods; works of Polish writers including A. Mickiewicz, J. Slowacki, H. Sienkiewicz, B. Prus, and W. Reymont. Prerequisite: One senior Polish course.

## 44.30 / *Political Science*

### 44.30.1 / JUNIOR COURSE

POL SC 200. *Elements of Political Science.* ♦6 (3-0). A study of the principles and practices of modern government, with emphasis on democratic constitutional government. Topics include the nature of government; types of constitutions; the functions and composition of the legislature, executive and judiciary; representation; political parties and pressure groups.

### 44.30.2 / SENIOR COURSES

POL SC 300. *Comparative Political Systems.* ♦6 (3-0). Comparative analysis of selected major political systems of the present day, with emphasis on the relationships between political functions and social processes. Note: Designed primarily for students who want one senior option in Political Science. Not open to students who are taking or have taken Political Science 200.

POL SC 310. *History of Political Thought.* ♦6 (3-0). An historical and critical survey of the development of political and social philosophy from ancient Greece to the present time, with selected readings from major political writers.

POL SC 315. *Political Analysis.* ♦6 (3-0). An introduction to systematic methods and techniques for the analysis of politics, including various techniques for gathering and analysing data and to the problems inherent in their use. Prerequisite: Political Science 200, or consent of the Department. Note: Open only to Honors students in Political Science and students for whom Political Science is a principal subject of concentration.

POL SC 320. *Government of Canada.* ♦6 (3-0). The structure and function of the government of Canada, especially of the Commons, the Senate, the Cabinet System, the Civil Service; and the role of political parties.

POL SC 322. *Local Government and Politics.* ♦6 (3-0). Urban and rural governments and their relationships with the provincial and national governments. Study of both formal institutions (legislative, executive, administrative, and judicial) and informal institutions such as parties and pressure groups.

POL SC 331. *Government of the United States.* ♦6 (3-0). A study of the history and background of American political institutions. Emphasis on the development, significance, and philosophy of the Constitution, and on parties, pressure groups and the working of congressional government.

POL SC 340. *Soviet Government and Politics.* ♦6 (3-0). Theory and practice of the Soviet state, with special attention to Bolshevik political theory, the Communist party, political institutions, federalism, and the policy-making processes in the U.S.S.R.

POL SC 360. *International Politics.* ♦6 (3-0). The elements and general nature of the relations between modern states. The framework and functioning of international institutions—law, diplomacy and organization with attention paid to the role of power and the efforts to achieve international peace.

POL SC 370. *Politics of Emergent Nations.* ♦6 (3-0). A comparative study of the problems and institutions of selected emerging nations, with special emphasis on development theories. Prerequisite: Political Science 200 or consent of the Department.

POL SC 371. *Governments of the United Kingdom and Commonwealth.* ♦6 (3-0). The structure and functioning of the government of the United Kingdom, and the adaptation of the Cabinet System in selected countries within the Commonwealth.

POL SC 373. *Government of the United Kingdom.* ♦6 (3-0). Its structure and functioning especially the monarchy, the cabinet system, parliament, the civil service and parties.

POL SC 375. *Political Process in Asia.* ♦6 (3-0). A survey of the political forces, processes, institutions, economic and political development with relation to the history, social characteristics, religion, and culture of the people in selected countries of Asia, such as India, Pakistan, Indonesia, Japan, Iran, and Turkey.

POL SC 383. *Governments of Western European Democracies.* ♦6 (3-0). The structure and functioning of the governments of selected Western European democracies.

POL SC 391. *Parties and Pressure Groups.* ♦6 (3-0). The role of political parties and pressure groups in the governmental process.

POL SC 393. *Political Sociology.* ♦6 (3-0) See INTER D 393.

POL SC 395. *Political Behavior.* ♦6 (3-0). Individual and mass political behavior from the sociological and psychological viewpoints.

POL SC 451. *Theory of Public Administration.* ♦6 (3-0). The place and significance of administration in government; administrative organization and management; governmental and public control of administration with special reference to Canada, the United Kingdom, and the United States. Prerequisite: Political Science 320 or 331 or 371.

POL SC 461. *International Organization.* ♦6 (3-0). The historical development, structure, and functions of international organizations, with special emphasis on the League of Nations, United Nations, and specialized agencies.

POL SC 463. *Developments in World Politics Since 1945.* ♦6 (3-0). A survey with special emphasis on the foreign policies of the major powers. Prerequisite: Political Science 200 or 360, or consent of the Department.

POL SC 465. *International Relations and World Law.* ♦6 (3-0). The nature of international law; the function of international law in society; the universal character of international law; the state and other international persons; sovereignty and equality; recognition of governments and states; territorial problems; jurisdiction and limitations; civil war and intervention; war and neutrality; international institutions; world government.

POL SC 467. *Philosophy and Theory of Law.* ♦6 (3-0). The concept of law; its purpose; the role of morality in its development; the various schools of legal thought, e.g. naturalist, analytical, functional; the ideas of the principal legal commentators and theorists.

### 44.30.3 / HONORS AND GRADUATE COURSES

POL SC 500. *Conference Course.* ♦6 (3-0).

POL SC 501. *Comparative Political Institutions.* ♦6 (3-0). Political institutions of democratic and non-democratic states.

POL SC 510. *Advanced Political Thought.* ♦6 (3-0). Detailed analysis of certain major politcial theories. Prerequisite: Political Science 310 or consent of the Department.

POL SC 515. *Quantitative Techniques of Political Analysis I: Statistics for Political Scientists.* ♦3 (First Term, 2-0). Prerequisite: Mathematics 30 or 100, or consent of the Department.

POL SC 516. *Quantitative Techniques of Political Analysis II: Computer Programming and Analysis.* ♦4 (Second Term, 2-2). Prerequisite: Political Science 515 or equivalent, or consent of the Department.

POL SC 521. *Canadian Government.* ♦3 (either term, 3-0).

POL SC 523. *Canadian Political Parties.* ♦3 (either term, 3-0).

POL SC 541. *Seminar in Soviet Politics.* ♦6 (3s-0). Advanced study of several areas of Soviet domestic politics. Prerequisite: Political Science 340, or consent of the Department.

POL SC 545. *Topics in Communism.* ♦6 (3-0). A seminar on select problems of the Communist bloc and the world Communist movement.

POL SC 546. *Soviet and East European Studies.* ♦6 (3-0). See INTER D 546.

POL SC 593. *Political Behavior.* ♦6 (3-0). Government and politics from a sociological and psychological point of view, including parties and pressure groups, public opinion, voting in elections, and voting in legislatures.

POL SC 600. *Political Institutions.* 6 (3-0).

POL SC 601. *Federalism.* ♦6 (3-0).

POL SC 603. *Comparative Government.* ♦6 (3-0).

POL SC 605. *Systematic Study of Politics.* ♦6 (3-0).

POL SC 607. *Comparative Federal Systems.* ♦3 (either term, 3-0).

POL SC 609. *Readings in Comparative Politics.* ♦3 (either term, 3-0). Prerequisite: Consent of the Department.

POL SC 610. *Political Theory.* ♦6 (3-0).

POL SC 613. *Seminar in Soviet Political Theory.* ♦6 (3-0).

POL SC 615. *Empirical Political Theory.* ♦3 (either term, 3-0).

POL SC 616. *Normative Political Theory.* ♦3 (either term, 3-0).

POL SC 619. *Readings in Political Philosophy.* ♦3 (either term, 3-0). Prerequisite: Consent of the Department.

POL SC 620. *Canadian National Government.* ♦3 (either term, 3-0).

POL SC 623. *Canadian Federalism.* ♦3 (either term, 3-0).

POL SC 629. *Readings in Canadian Government and Politics.* ♦3 (either term, 3-0). Prerequisite: Consent of the Department.

POL SC 641. *Research in Soviet Government.* ♦6 (3-0).

POL SC 649. *Readings in Soviet Politics.* ♦3 (either term, 3-0). Prerequisite: Consent of the Department.

POL SC 651. *Public Administration.* ♦6 (3-0).

POL SC 660. *Theories of International Politics.* ♦6 (3-0).

POL SC 661. *International Politics.* ♦6 (3s-0).

POL SC 663. *Problems of International Organization: Political and Security.* ♦6 (3-0).

POL SC 665. *Problems of International Organization: Economic and Social.* ♦6 (3-0).

POL SC 667. *International Behavior.* ♦6 (3-0).

POL SC 668. *Readings in International Politics.* ♦3 (either term, 3-0). Prerequisite: Consent of the Department.

POL SC 669. *Readings in International Organization and Law.* ♦3 (either term, 3-0). Prerequisite: Consent of the Department.

POL SC 675. *Systems Analysis: Asian Political Systems.* ♦6 (3-0).

POL SC 679. *Readings in Asian Politics.* ♦3 (either (either term, 3-0). Prerequisite: Consent of the Department.

POL SC 680. *Western European Democracies.* ♦6 (3-0).

POL SC 689. *Readings in Western European Government and Politics.* ♦3 (either term, 3-0). Prerequisite: Consent of the Department.

POL SC 690. *Political Behavior.* ♦6 (3-0).

POL SC 695. *Political Psychology.* ♦6 (3-0). Prerequisite: Consent of the Department.

POL SC 698. *Readings in Political Psychology.* ♦3 (either term, 3-0). Prerequisite: Consent of the Department.

POL SC 699. *Readings in Political Behavior.* ♦3 (either term, 3-0). Prerequisite: Consent of the Department.

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## 44.31 / *Psychology*

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### 44.31.1 / JUNIOR COURSES

PSYCO 202. *Introduction to General Psychology.* ♦6 (3-0). A survey of problems, methods, and principles in various fields of psychology.

PSYCO 212. *General and Developmental Psychology.* ♦6 (3-0). A survey of problems, methods, and principles in several fields of psychology, with particular emphasis on child, adolescent, and adult development and behavior. Note: Designed primarily for students in professional schools, such as Nursing and Physical Education, and not open to students with credit in another introductory course in Psychology. Only one of Psychology 202 or 212 may be offered for credit.

### 44.31.2 / SENIOR COURSES

PSYCO 301. *Honors Seminar.* ♦6 (3-1). Current topics in Psychology. Note: Required of all Honors students during their second year.

PSYCO 320. *Psychology Applied to Business and Industry.* ♦6 (3-0). Methods and results of psychological studies in such fields as: selection, placement, training and supervision of personnel; promotion of efficiency and safety in production; advertising, selling and consumer research.

PSYCO 337. *Individual Differences.* ♦3 (either term, 3-0). A survey of the biological and social conditions contributing to variations among individuals; methods for describing individuality. Corequisite: Psychology 309 or consent of the Department.

PSYCO 341. *Social Psychology.* ♦3 (either term, 3-0). Individual and group behavior observed in social processes. Prerequisite: Psychology 202 or Sociology 202. Note: Psychology 341 and Sociology 341 may not both be taken for credit.

PSYCO 353. *Developmental Psychology.* ♦3 (either term, 3-0). Behavior as it is related to normal development and aging. Prerequisite: Psychology 202 or consent of the Department.

PSYCO 383. *Personality.* ♦3 (either term, 3-0). An introductory survey including representative theoretical points of view and research relevant to the major problems of the study of personality. Prerequisite: Psychology 202.

PSYCO 401. *Honors Seminar.* ♦6 (3-1). Current topics in Psychology. Note: Required of all Honors students during their third year.

PSYCO 431. *Theory and Practice of Psychometrics.* ♦3 (either term, 3-3). The nature of psychological tests, with practical work in administration, scoring and interpretation of tests. Prerequisite: Psychology 202 and 309, or consent of the Department.

PSYCO 441. *Experimental Social Psychology.* ♦3 (either term, 3-2). Basic research design, techniques and procedure in experimental studies in social psychology. Independent investigation in such areas as group dynamics and psycholinguistics. Prerequisite: Psychology 202 or Sociology 202; Psychology 309 and one half-course in Experimental Psychology, or consent of the Department.

PSYCO 447. *Psychology of Religion.* ♦3 (either term, 3-0). Prerequisite: Psychology 202 and 383, or consent of Department.

PSYCO 489. *Abnormal Psychology.* ♦3 (either term, 3-0). A general introduction. Prerequisite: Psychology 202 and either Psychology 383 or consent of the Department.

PSYCO 490. *Psychology of Alienation.* ♦3 (Second Term, 3-0). Psychological aspects of such conditions as loneliness, meaninglessness, existential anguish, and isolation. Prerequisite: Psychology 341 or Sociology 341 or Psychology 489.

PSYCO 492. *Creativity.* ♦3 (First Term, 3-0). Theories and research concerning the creative process, including an attempt at understanding the manifestations of the creative process in different fields. Prerequisite: Consent of the Department. Note: Open to senior students in any department. Some effort will be made to select students with diverse academic training.

## 44.31.3 / HONORS AND GRADUATE COURSES

PSYCO 501. *Honors Seminar.* ♦6 (3-1). Discussion of current topics in Psychology. Note: Required of all honors Psychology students during their fourth year.

PSYCO 502. *History and Systems.* ♦6 (3-0). An historical survey of problems and theories in Psychology, including modern systems in Psychology.

PSYCO 520. *Seminar in Industrial Psychology.* ♦6 (3-0). Prerequisite: Psychology 320.

PSYCO 535. *Clinical Assessment I.* ♦6 (3-3). Tests of intellectual function from Binet to the present. Prerequisite: Psychology 431 or consent of the Department.

PSYCO 536. *Clinical Assessment II.* ♦6 (3-3). Theory of projective tests, with study of the Rorschach and the various drawing and thematic tests. Prerequisite: Psychology 535 or consent of the Department.

PSYCO 537. *Clinical Method I.* ♦6 (4-0). Conference course. Principles involved in the analysis of case material. Prerequisite or corequisite: Psychology 536, 586 or consent of the Department. Note: This course is offered in the Summer and Winter Sessions.

PSYCO 538. *Clinical Assessment III.* ♦6 (3-3). Various diagnostic tests for special behavioral conditions. Prerequisite: Psychology 536 or consent of the Department.

PSYCO 539. *Clinical Method II.* ♦6 (3-3) Conference course. Principles of analysis, reporting, and psychotherapy. Prerequisite or corequisite: Psychology 537, 588, 590 or consent of the Department. Note: This course is offered in the Summer and Winter Sessions.

PSYCO 540. *Seminar in Social Psychology.* ♦6 (3-0).

PSYCO 550. *Experimental Analysis of Personality.* ♦3 (either term, 3-0). Latest techniques for measurement and experimental study of such personality factors as neuroticism, anxiety, hysteria, extroversion, conflict, and motivation structure. Prerequisite: Psychology 202 and 383, or consent of the Department.

PSYCO 574. *Seminar in Philosophy and Psychology.* (See INTER D 574).

PSYCO 583. *Personality and Social Psychology.* ♦6 (3-0). Advanced survey of Differential and Social Psychology. Emphasis on representative theoretical points of view and research relevant to the major problems in the area of personality and on social influences on behavior.

PSYCO 584. *Seminar in Personality Theory.* ♦6 (3s-0). Prerequisite: Psychology 383 and 583, or consent of the Department.

PSYCO 586. *Normality, Neurosis, Sociopathy.* ♦6 (3-0). Views of normality, theories and syndromes of neurosis and sociopathic personality. Prerequisite: Psychology 489 or consent of the Department.

PSYCO 588. *The Psychoses.* ♦6 (3-0). The symptoms and dynamics of the major functional psychoses. Prerequisite: Psychology 586 or consent of the Department.

PSYCO 590. *Systems in Psychotherapy.* ♦6 (3-0). A survey of important theoretical developments in psychotherapy. Prerequisite: Psychology 588 or consent of the Department.

PSYCO 592. *Psychological Therapies.* ♦6 (3-3). Psychological therapies, with practical instruction in selected techniques. Prerequisite: Psychology 590 or consent of the Department.

PSYCO 599. *Honors Thesis.* ♦6 (3-3). Students in their fourth year of honors will pursue a research project under the direction of a member of the Department.

PSYCO 600. *Research Seminar.* ♦2 (2s-0). Note: Required each year of all graduate students in the Department of Psychology and for fourth year honors students.

PSYCO 610-611. *Topics in Learning.* ♦3 (either term, 3-0).

PSYCO 612-613. *Topics in Perception.* ♦3 (either term, 3-0).

PSYCO 614-615. *Topics in Social Psychology.* ♦3 (either term, 3-0).

PSYCO 616-617. *Topics in Personality.* ♦3 (either term, 3-0).

PSYCO 618-619. *Topics in Clinical Psychology.* ♦3 (either term, 3-0).

PSYCO 620-621. *Topics in Cognition.* ♦3 (either term, 3-0).

PSYCO 648. *Research.* ♦3 (First Term, 3-3).

PSYCO 649. *Research.* ♦3 (Second Term, 3-3).

PSYCO 698. *Advanced Research Techniques I.* ♦3 (3L-0). Supervised experience in specialized research techniques.

PSYCO 699. *Advanced Research Techniques II.* ♦3 (3L-0). Supervised experience in specialized research techniques.

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## 44.32 / *Religious Studies*

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RELIG 200. *Introduction to the Study of Religion.* ♦6 (3-0). The origin and development of the history of religions as a separate academic discipline. Principles and methods of this discipline. Some account of the major living religions in their history and distinctive features.

RELIG 310. *Religions of the East.* ♦6 (3-0). A survey of the religions of India, China and Japan, including some account of the growth in the appreciation of these religions by the West, and the interrelationship of cultural values of East and West.

RELIG 360. *The Concept of Deity.* ♦6 (3-0). Different concepts of God as found in the various religions of the world, with particular attention to the origin and growth of monotheism.

RELIG 400. *Patterns in Comparative Religion.* ♦6 (3-0). Themes and patterns of religious experience as evidenced in the history of religions.

RELIG 420. *Myth and Truth in Religious Thought.* ♦6 (3-0). An introduction to the problems raised by religious languages and the claim of religious teaching to embody truth in a distinctive fashion.

NOTE: Courses of related interest offered by affiliated colleges are listed in § 246 of the General section of the Calendar.

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## 44.33 / *Romance Linguistics*

Department of Romance Languages

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### 44.33.1 / JUNIOR COURSE

ROM LG 200. *Introduction to the Romance Languages.* ♦6 (3-0). The phonology, morphology, syntax, and lexicology of French, Spanish, and Italian. Prerequisite or corequisite: French 200 or Spanish 100 or Italian 100 or Latin 100 or the equivalent.

### 44.33.2 / SENIOR COURSE

ROM LG 397. *Introduction to Romance Linguistics.* ♦6 (3-0). General introduction to Linguistics; a descriptive-comparative treatment of modern French, Spanish, and Italian; an outline of the main phonological and morphological changes leading from Latin to the Romance Languages. Prerequisite: French 100 or Latin 100 or Spanish 100 or Italian 100 or equivalent.

### 44.33.3 / HONORS AND GRADUATE COURSES

ROM LG 500. *Phonology: Synchronic and Diachronic.* ♦6 (3-0). The basic features of phonemic theory, synchronic and diachronic, with particular reference to the functional and structural analysis of linguistic expression in the Romance languages. Prerequisite: Romance Linguistics 397 or Linguistics 370 or equivalent.

ROM LG 501. *Catalan.* ♦6 (-30). Introduction to spoken and written modern Catalan, with reference to historical developments in older stages of the language.

ROM 505. *Comparative Romance Linguistics.* ♦6 (3-0). The principles of comparative and historical linguistics, with emphasis on the linguistic evolution from Latin to modern French, Spanish, and Italian. Prerequisite: Romance Linguistics 397 or equivalent.

ROM LG 699. *Conference Course.* ♦6 (3-0). Designed to meet the needs of individual graduate students. A detailed study of a topic not dealt with in other graduate courses.

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## 44.34 / *Russian*

Department of Slavonic Languages

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### 44.34.1 / JUNIOR COURSES

RUSS 100. *Beginners' Russian (Arts Section).* ♦6 (3-2). Essentials of grammar, reading, and drill on useful expressions. Designed to give a working knowledge of the Russian language.

RUSS 201. *Practical Study of the Russian Language.* ♦2 (0-1). Second year Honors laboratory hour.

RUSS 210. *Beginners' Russian (Science Section).* ♦6 (3-0). Note: Designed to meet the needs of honors students in the science departments, students of the faculties of Engineering, Agriculture, Dentistry, Medicine and Graduate Studies of any year who require a reading knowledge of Russian scientific literature. Not open to general program students.

### 44.34.2 / SENIOR COURSES

RUSS 300. *Second Year Russian (Arts Section).* ♦6 (3-0). Advanced Russian grammar, composition, and oral practice based on selected texts of Russian classical and contemporary literature. Prerequisite: Russian 100.

RUSS 302. *Practical Study of the Russian Language.* ♦2 (0-1). Third year Honors laboratory hour.

RUSS 310. *Second Year Russian (Science Section).* ♦6 (3-0). A continuation of Russian 210. Russian scientific articles of current interest discussed and translated. Designed to give students a sufficient command of the language to enable them to translate advanced Russian texts in their fields of study. Note: Students who pass this course with a grade of at least 6 will be considered by the Department as having satisfied the reading requirement in Russian for the M.Sc. or Ph.D. at The University of Alberta.

RUSS 320. *Selected Poetry Prose and Drama of the Nineteenth Century.* ♦6 (3-0). Reading and literary study of selected poems, one play, and one major classical novel. Prerequisite or corequisite: One senior Russian course.

RUSS 360. *Russian Literature of the Eighteenth and Nineteenth Centuries.* ♦6 (3-0). Classicism, Sentimentalism, Romanticism, Realism, and their foremost representatives. Social and political background. Advanced Russian grammar and composition based on short stories of the nineteenth century. Authors studied include Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Chekhov, and L. N. Tolstoy. Prerequisite: One senior Russian course.

RUSS 374. *Contrastive Analysis of Russian and English.* ♦6 (3-0). See INTER D 374.

RUSS 380. *Russian Drama.* ♦6 (3-0). History of the Russian Drama and a critical reading of five classics: Krylov's *The Lesson to the Daughters* (*Urok dochkam*), Griboyedov's *Woe from Wit* (*Gore ot uma*), A. N. Ostrovsky's *The Thunderstorm* (*Groza*), Gogol's *The Inspector General* (*Revizor*) and Chekhov's *The Cherry Orchard* (*Vishnevyi sad*). Prerequisite One senior Russian course.

RUSS 390. *Russian Composition and Conversation.* ♦6 (3-0). Difficult grammatical points with special emphasis on syntax. Compositions based either on literary works read and discussed in class, or on the different types of Russian correspondence. Prerequisite: Russian 300 and 360.

RUSS 400. *Russian Literature of the Late Nineteenth and Early Twentieth Centuries.* ♦6 (3-0). New literary movements of the period (the religious philosophers, mystical revolutionism, the aesthetic revival and the symbolists, socialist messianism) up to and including the principles of Socialist Realism of Soviet literature, with particular attention to the works of L. N. Tolstoy, Merezhkovsky, Ivanov, Blok, Bely, Balmont, Sologub, Remizov, Gumilev, Mayakovsky, Akhmatova, Pasternak, and others. Prerequisite: Two senior courses in Russian.

RUSS 403. *Practical Study of the Russian Language.* ♦2 (0-1). Fourth year Honors laboratory hour.

RUSS 420. *History of the Russian Language.* ♦6 (3-0). Prerequisite: One senior Russian course.
RUSS 440. *The Structure of Russian.* ♦6 (3-0). Detailed treatment of some specific problems in a grammar of Contemporary Standard Russian. Problems in the phonology and syntax of Russian; various alternative proposals in linguistic theory to deal with these problems.
RUSS 460. *A. S. Pushkin.* ♦6 (3-0). Prerequisite: Two Russian courses.

### 44.34.3 / HONORS AND GRADUATE COURSES

RUSS 500. *Special Reading Course.* ♦6 (3-0). Note: For graduate students who wish to prepare themselves for the M.A. or Ph.D. language requirement. Students who pass this course with a grade of at least 6 will be considered by the Department as having satisfied the reading requirement for the above degree at The University of Alberta.
RUSS 516. *N. V. Gogol.* ♦6 (3-0).
RUSS 518. *I. S. Turgenev.* ♦6 (3-0).
RUSS 520. *L. N. Tolstoy.* ♦6 (3-0).
RUSS 522. *A. P. Chekhov.* ♦6 (3-0).
RUSS 524. *M. Gorky.* ♦6 (3-0).
RUSS 550. *The Russian Psychological Novel.* ♦6 (3-0).
RUSS 570. *Soviet Russian Literature.* ♦6 (3-0).
RUSS 610. *Russian Medieval Literature.* ♦3 (Second Term, 3-0).
RUSS 640. *Russian Poetry from A. D. Kantemir to the Present.* ♦6 (3-0).
RUSS 699. *Conference Course.* A detailed study of some great author or a literary problem or period not dealt with in the other Honors and graduate courses. Designed to meet the needs of individual honors or graduate students.

## 44.35 / *Scandinavian*

Department of Germanic Languages

### 44.35.1 / JUNIOR COURSES

SCAND 100. *Elementary Norwegian.* ♦6 (3-2). Reading of literary and cultural material and composition. The oral approach, using language laboratory, is followed.

### 44.35.2 / SENIOR COURSES

SCAND 300. *Second Year Norwegian.* ♦6 (3-1). Reading and study of selected texts in Norwegian literature and culture. Composition and conversation. Prerequisite: Norwegian 100.
SCAND 350. *Modern Scandinavian Literature in English.* ♦6 (3-0). The modern drama (Ibsen, Strindberg) and representative prose works (Hamsun, Undset, Jacobsen, Lagerkvist, Dinesen, Lagerlof).
SCAND 370. *Introduction to Scandinavian Literature.* ♦6 (3-0). Reading of representative works (all genres) in the original (Norwegian and Danish). Prerequisite: Scandinavian 300 or consent of the Department.

### 44.35.3 / HONORS AND GRADUATE COURSE

SCAND 550. *Old Icelandic Philology.* ♦6 (3-0).

## 44.36 / *Serbo-Croatian*

Department of Slavonic Languages

SER C 100. *Beginners' Serbo-Croatian.* ♦6 (3-2). Essentials of grammar, reading, and drill on useful expressions. Designed to give a working knowledge of Serbo-Croatian.

## 44.37 / *Slavonics*

Department of Slavonic Languages

### 44.37.1 / HONORS AND GRADUATE COURSES

SLAV 510. *Research Seminar.* ♦2 (1s-0). Bibliography and methodology. Note: Open only to graduate students.
SLAV 520. *Old Church Slavonic.* ♦6 (3-0). Readings in the first literary language of the Slavs.
SLAV 540. *Contrastive Slavonic Linguistics.* ♦6 (3-0).
SLAV 546. *Soviet and East European Studies.* See INTER D 546.
SLAV 550. *Seminar in Slavonic Linguistics.* ♦6 (3-0).
SLAV 600. *Early Literature of the Kievan Period.* ♦3 (First Term, 3-0).
SLAV 620. *Comparative Slavonic Literature.* ♦6 (3-0).
SLAV 640. *Socialist Realism—Theory and Practice.* ♦6 (3-0).
SLAV 650. *Departmental Seminar on Modern Slavonic Philology and Linguistics.* ♦2 (1s-0). Note: Open only to honors and graduate students.
SLAV 680. *Slavonic Civilization.* ♦6 (3-0).
SLAV 699. *Conference Course.* A detailed study of some Slavonic literary or linguistic problem or topic not dealt with in the other Honors and graduate courses. Designed to meet the needs of individual honors or graduate students.

## 44.38 / *Sociology*

### 44.38.1 / JUNIOR COURSE

SOC 202. *Introductory Sociology.* ♦6 (3-0). An analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society analysed in terms of its structure, culture, and social ranking schemes. The interrelationships between the various institutions (e.g. family, church, school, government). The processes whereby the individual is socialized into society; the sources of conformist and nonconformist behavior. Note: Third-year or more advanced students are encouraged to take Sociology 403 rather than 202.

### 44.38.2 / SENIOR COURSES

SOC 311. *Statistics and Social Research.* ♦6 (3-2). The logic and interpretation of statistical concepts and methods in the social sciences; measures of central tendency, variability and relationship; sampling and tests of hypotheses. Techniques of social measurement, data collection, and data processing. Experimental design. Note: Accepted as a Science course in B.A. programs.

SOC 320. *Social Problems.* ♦6 (3-0). Deviant behavior (e.g. crime, juvenile delinquency, drug addiction) and social disorganization, including world population problems, urban and rural problems, industrial and other problems.

SOC 325. *Criminology.* ♦3 (either term, 3-1). Examination and attempted explanation of crime and juvenile delinquency, with an analysis of the social processes leading to criminal behavior. Prerequisite: One previous course in Sociology, or consent of the Department.

SOC 327. *Penology and Corrections.* ♦3 (either term, 3-1). The evolution and evaluation of the theories of punishment, the law and the courts, penal and reformatory institutions, probation and parole, experiments in reform and rehabilitation. Prerequisite: Sociology 325.

SOC 329. *Juvenile Delinquency.* ♦3 (either term, 3-1). Juvenile delinquency and its relation to adult crime; the social processes involved in the genesis and perceptions of styles of delinquency and their relationship to the community, and to various current theories of prevention and control, including the role of institutions and law. Prerequisite: Sociology 325.

SOC 341. *Social Psychology.* ♦3 (either term, 3-0). An introduction to the study of individual and group behavior observed in social processes. Prerequisite: Sociology 202 or 403 or Psychology 202 or Educational Psychology 276. Note: Sociology 341 and Psychology 341 may *not* both be taken for credit.

SOC 343. *Collective Behavior.* ♦3 (either term, 3-0). Analysis of various forms of collective behavior, including crowds, mobs, social movements, and fugitive behavior patterns. Prerequisite: Sociology 341 or Psychology 341 or consent of the Department.

SOC 344. *Public Opinion and Mass Communication.* ♦3 (either term, 3-0). The nature of public opinion; factors involved in its assessment and its formation. The role of the media of mass communication. Prerequisite: Sociology 341 or Psychology 341 or consent of the Department.

SOC 351. *Population.* ♦3 (either term, 3-0). World population trends and problems; social and cultural factors underlying fertility, mortality, and migration patterns and differentials; their relationship to the "population explosion", population composition and distribution; ecological theories and processes; urbanization; population theory and policy. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 356. *Sociology of Rural Life.* See INTER D 356.

SOC 361. *Social Organization.* ♦3 (either term, 3-0). Social systems, their components, interrelations, and the bases of social differentiation and integration. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 363. *Industrial Sociology.* ♦3 (either term, 3-0). Sociology of industrial societies, the development of industrialism; trade unionism and labor-management relations; bureaucracy; formal and informal groups; technology and social change. Prerequisite: Sociology 202, 403 or consent of the Department.

SOC 367. *Values and Belief Systems.* ♦3 (either term, 3-0). The origins, developments, and social consequences of systems of beliefs and values. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 368. *Minority and Ethnic Group Relations.* ♦3 (either term, 3-0). Problems arising from racial and minority status. Sources of prejudice, current theories of race and culture, and the effect of interracial and minority group contacts. Situations requiring adjustment and social treatment. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 370. *The Family.* ♦6 (3-0). Structure and function of the family, comparative family systems, sociology of family life stages (childhood, adolescence, adulthood, old age), current trends and problems of the family.

SOC 373. *Social Psychology of Health and Illness.* ♦3 (either term, 3-0). Social psychological factors in health and illness and medical care, including attitudes, beliefs, roles, socialization, and interpersonal processes. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 374. *Social Organization of Health Care.* ♦3 (either term, 3-0). The social structure and dynamics of health care organization, including hospitals, professional-bureaucratic relations in health care organizations, professional socialization, and governmental functions. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 376. *Sociology of Religion.* ♦3 (either term, 3-0). Religious behavior in modern society. Special attention to the relationship between religion and social stratification, economics, and social change. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 393. *Political Sociology.* See INTER D 393.

SOC 403. *Principles of Sociology.* ♦3 (either term, 3-0). Basic concepts and principles of Sociology for students with advanced standing. Prerequisite: Senior or graduate standing. Note: Not open to Sociology majors and carries no credit for those with Sociology 202 credit.

SOC 411. *Methods of Social Research.* ♦3 (First Term, 3-2). The design of social research projects, the assumptions of social research, logic of inference instrument design (including scaling and the techniques and logic of control), and data collection. Prerequisite: Sociology 311 or consent of the Department.

SOC 412. *Methods of Sociological Analysis.* ♦3 (Second Term, 3-2). The analysis of data and the interpretation of the results of research projects; statistical inference, measures of association and interaction between variables; probability statistics; regression; and mathematical models. Prerequisite: Sociology 411 or consent of the Department.

SOC 425. *Research Problems in Criminology.* ♦3 (either term, 3-2). Theories of criminal behavior and various methods of testing the hypotheses emerging from these theories. Prerequisite: Sociology 325, and either Sociology 311 or consent of the Department.

SOC 426. *Criminal Control.* ♦3 (either term, 3-0). Study of proposals advanced to control criminal behavior; the interrelationship of the social sciences with the law, law enforcement and welfare agencies. Prerequisite: Sociology 325.

SOC 428. *Criminal Careers.* ♦3 (Second Term, 3-1). Analysis of types of criminal behavior through the use of individual and limited case methods; social processes involved in the genesis and styles of crime as they apply to the involvement of the particular criminal and victim. Prerequisite: Sociology 325.

SOC 432. *The Development of Sociology.* ♦3 (either term, 3-0). Major writers who have shaped contemporary sociology, including Marx, Weber, Durkheim, Simmel; recurrent concepts and issues that continue to challenge sociological inquiry. Prerequisite: Sociology 202, 403 or consent of the Department.

SOC 437. *The Sociology of Knowledge.* ♦3 (either term, 3-0). The emergence and clarification of sociological thought from Plato to Tönnies; an introduction to the sociology of knowledge. Pre-

requisite: Sociology 202 or 403 or consent of the Department.

SOC 440. *Advanced Social Psychology.* ♦3 (either term, 3-0). Current theories and related research in social psychology. Prerequisite: Sociology 341 or Psychology 341 or consent of the Department.

SOC 447. *Leadership.* ♦3 (either term, 3-0). Group interaction and the differentiation of leaders; the nature and techniques of leadership in various social systems. Prerequisite: Sociology 341 or Psychology 341 or consent of the Department.

SOC 451. *Fertility and Society.* ♦3 (First Term, 3-0). Vital processes with special emphasis on the social, social-psychological and cultural correlates of fertility; problems of fertility prediction and control in large and small family societies; research methods and research problems. Prerequisite: Sociology 351 or consent of the Department.

SOC 453. *Sociology of the Metropolis.* ♦3 (either term, 3-0). The metropolis with special reference to its ecological, demographic, institutional, and social psychological characteristics and their interrelationships. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 455. *Migration.* ♦3 (Second Term, 3-0). Internal and international migration and its relationship to resources and economic opportunities; the implications of population movement for societal organization. Prerequisite: Sociology 351 or consent of the Department.

SOC 456. *Rural Social Problems and Public Policy.* See INTER D 456.

SOC 458. *Agrarian Social Movements.* See INTER D 458.

SOC 459. *Sociology of Community Development.* See INTER D 459.

SOC 460. *Social Organization — Organizational Theory.* ♦3 (either term, 3-0). Models of social organization; the units of social structure; the bases of social integration, social control, and social change. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 463. *Sociology of Professions.* ♦3 (either term, 3-0). The process of professionalization, including the development of professional ethics, ideologies, and associations. The role of bureaucracy in professionalization and professional career patterns. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 465. *Formal Organization.* ♦3 (either term, 3-0). The nature and implications of formal organizations, including theories and studies of bureaucracy. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 467. *Social Class in Modern Society.* ♦3 (either term, 3-0). Social stratification in Western society, with reference to the effects of industrialization; comparative analysis of primitive societies. Special attention given to the basis of stratification, the structure and function of social class systems, social mobility, and the special classes in modern society, such as the "managerial class", labor, and "power elite". Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 469. *Sociology of Work and Leisure.* ♦3 (either term, 3-0). The nature, meaning, and functions of work in historical and cross-cultural context; sociological analysis of work and leisure; changing uses and meaning of leisure time.

SOC 472. *Canadian Society.* ♦3 (either term, 3-0). The composition of the Canadian population; the value hierarchy, the nature and relationships of the major institutions, and the structure of Canadian society. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 473. *Advanced Medical Sociology.* ♦3 (either term, 3-0). Health needs and resources in various societies with emphasis on current research. Topics include social processes in the definition, cause, and distribution of illness; and the formal and informal organization of health care. Prerequisite: Sociology 202 or 403 and third or fourth year standing or consent of the Department. Note: Not open to students with credit for Sociology 373 or 374.

SOC 480. *Social Change.* ♦3 (either term, 3-0). Significance of change in social and cultural systems; theories of social change; problems of induced change in selected cultures. Prerequisite: Sociology 202 or 403 or consent of the Department.

## 44.38.3 / HONORS AND GRADUATE COURSES

SOC 500. *Second Year Honors Seminar.* ♦2 (1s-0).

SOC 501. *Third Year Honors Seminar.* ♦2 (1s-0).

SOC 503. *Conference Course in Sociology for Honors and Graduate Students.* ♦3 (First Term, 3-0).

SOC 504. *Conference Course in Sociology for Honors and Graduate Students.* ♦3 (Second Term, 3-0).

SOC 511. *Selected Topics in Sociological Analysis.* ♦3 (either term, 3-0).

SOC 518. *Research Seminar.* ♦3 (either term, 3-0).

SOC 519. *Selected Topics in Research.* ♦3 (either term, 3s-0).

SOC 521. *Seminar in Theories of Deviance.* ♦3 (First Term, 3-0).

SOC 522. *Selected Topics in Deviance and Social Control.* ♦3 (Second Term, 3-0).

SOC 526. *Seminar in Criminological Theory.* ♦3 (either term, 3s-0).

SOC 527. *Seminar in Correctional Theory.* ♦3 (either term, 3s-0).

SOC 531. *Seminar in Contemporary Theories of Society.* ♦3 (either term, 3-0).

SOC 532. *Seminar in Theory Construction.* ♦3 (either term, 3-0).

SOC 537. *Seminar in the Sociology of Knowledge.* ♦3 (either term, 3-0).

SOC 541. *Seminar in Symbolic Behavior.* ♦3 (either term, 3-0).

SOC 542. *Small Group Behavior.* ♦3 (either term, 3-2).

SOC 543. *Seminar in Mass Phenomena.* ♦3 (either term, 3-0).

SOC 544. *Seminar in Socialization Processes.* ♦3 (either term, 3-0).

SOC 551. *Seminar in Demography.* ♦3 (either term, 3s-0).

SOC 553. *Seminar in the Human Community.* ♦3 (either term, 3s-0).

SOC 561. *Seminar in Social Organization.* ♦3 (either term, 3s-0).

SOC 562. *Seminar in Social Class.* ♦3 (either term, 3s-0).

SOC 565. *Seminar in Work and Formal Organization.* ♦3 (either term, 3s-0).

SOC 568. *Seminar in Ethnic and Minority Relations.* ♦3 (either term, 3-0).

SOC 570. *Seminar in the Family.* ♦3 (either term, 3s-0).

SOC 573. *Seminar in Medical Sociology.* ♦3 (either term, 3s-0).

SOC 574. *Selected Topics in Medical Sociology.* ♦3 (either term, 3s-0).

SOC 580. *Seminar in Sociology of Modernization.* ♦3 (either term, 3s-0).

SOC 593. *Seminar in Political Sociology.* ♦3 (either term, 3-0).

SOC 603. *Conference Course.* ♦3 (First Term, 3-0).

SOC 604. *Conference Course.* ♦3 (Second Term, 3-0).

SOC 611. *Seminar in Social Research Techniques and Theory.* ♦3 (either term, 3-0).
SOC 631. *Seminar in Sociological Theory.* ♦3 (either term, 3-0).
SOC 641. *Selected Topics in Social Psychology.* ♦3 (either term, 3-0).
SOC 642. *Experimental Small Group Research.* ♦3 (either term, 3s-0).
SJC 673. *Field Research in Medical Sociology.* ♦3 (either term, 3s-0).

## 44.39 / *Spanish*

Department of Romance Languages

### 44.39.1 / JUNIOR COURSE

SPAN 100. *Beginners' Spanish.* ♦6 (3-2). Spanish grammar and pronunciation; an introduction to Spanish and Hispano-American civilization.

### 44.39.2 / SENIOR AND ADVANCED COURSES

SPAN 201. *Second Year Honors Laboratory Hour.* ♦2 (0-1).
SPAN 300. ♦6 (3-0). Intensive grammar, composition, and conversation; a general survey of Spanish literature.
SPAN 302. *Third Year Honors Spanish Language Seminar.* ♦2 (1-0).
SPAN 310. *A Survey of Spanish Literature.* ♦6 (3-0). The main authors from the Middle Ages to the Generation of 1898. Prerequisite or corequisite: Spanish 300.
SPAN 330. *Contemporary Spanish Authors.* ♦6 (3-0). A survey of the development of Spanish peninsular literature from the Generation of 1898 to the most recent novelists, poets and playwrights. Prerequisite: Spanish 300.
SPAN 340. *Spanish American Literature.* ♦6 (3-0). A survey of the development of the national literature of Spanish America, from the early nineteenth century to the present. Corequisite: Spanish 300 or 330.
SPAN 360. *Literature of the Golden Age.* ♦6 (3-0). The forms and development chiefly of prose works in the Golden Age. Prerequisite or corequisite: Spanish 330.
SPAN 370. *Spanish Poetry and Drama from the Late Fifteenth Century to* 1700. ♦6 (3-0). Their main forms and development through the Golden Age studied in a wide choice of texts. Prerequisite or corequisite: Spanish 330.
SPAN 390. *Spanish Phonology.* ♦6 (3-0). Phonetics and phonemics of the Spanish language.

### 44.39.3 / HONORS AND GRADUATE COURSES

SPAN 403. *Fourth-Year Honors Spanish Language Seminar.* ♦2 (1-0).
SPAN 503. *Spanish American Dialectology.* ♦6 (3-0). Phonetic, syntactic and semantic traits of American Spanish.
SPAN 540. *History of the Spanish Language.* ♦6 (3-0).
SPAN 550. *Medieval Narrative Poetry.* ♦6 (3-0). The main extant texts, from the *Peima de Mio Cid* to Juan Ruiz's *Libro de Buen Amor.* The formation of the Romancero.
SPAN 560. *Medieval Spanish Prose.* ♦6 (3-0).
SPAN 565. *Medieval Lyric Poetry.* ♦6 (3-0).
SPAN 600. *The Literature of the Discovery, Conquest and Colonization of America.* ♦6 (3-0).
SPAN 610. *The Sentimental Romances and the Books of Chivalry. The Pastoral and Moresque Novel.* ♦6 (3-0).
SPAN 612. *The Picaresque Novel.* ♦6 (3-0).
SPAN 615. *Cervantes.* ♦6 (3-0).
SPAN 620. *Sixteenth-Century Drama.* ♦6 (3-0).
SPAN 624. *Lope de Vega.* ♦6 (3-0).
SPAN 626. *Tirso de Molina and Juan Ruiz de Alarcon.* ♦6 (3-0).
SPAN 627. *Calderon.* ♦6 (3-0).
SPAN 630. *The Romancero.* ♦6 (3-0).
SPAN 633. *The Poetry of the Baroque Period.* ♦6 (3-0).
SPAN 635. *Gongora.* ♦6 (3-0).
SPAN 640. *Quevedo and Gracian.* ♦6 (3-0).
SPAN 650. *The Novel, Poetry and Drama of the Eighteenth Century.* ♦6 (3-0).
SPAN 660. *The Romantic Movement.*
SPAN 665. *Galdos and his Contemporaries.* ♦6 (3-0).
SPAN 670. *Contemporary Spanish and Spanish-American Poetry.* ♦6 (3-0).
SPAN 671. *Contemporary Spanish and Spanish-American Novelists.* ♦6 (3-0).
SPAN 675. *Unamuno.* ♦6 (3-0).
SPAN 699. *Conference Course.* A detailed study of some great author or literary question not dealt with in other honors or graduate courses. Designed to meet the needs of individual honors or graduate students.

## 44.40 / *Ukrainian*

Department of Slavonic Languages

### 44.40.1 / JUNIOR COURSES

UKR 100. *Beginners' Ukrainian.* ♦6 (3-2). Essentials of grammar, reading and drill on useful expressions. Designed to give a working knowledge of the Ukrainian language.
UKR 200. *First Year University Ukrainian.* ♦6 (3-1). A brief review of phonology, an intensive study of grammar. Readings of selected texts from modern Ukrainian literature, and elementary composition supplemented by laboratory work in conversational Ukrainian. Designed for students having some previous knowledge of Ukrainian. Prerequisite: Ukrainian 30 or the consent of the Department.
UKR 201. *Practical Study of the Ukrainian Language.* ♦2 (0-1). Second year Honors laboratory hour.

### 44.40.2 / SENIOR COURSES

UKR 300. *Second Year Ukrainian.* ♦6 (3-0). Advanced Ukrainian grammar, composition, and oral practice based on selected texts of Ukrainian classical and contemporary literature. Prerequisite: Ukrainian 100 or consent of the Department.
UKR 302. *Practical Study of the Ukrainian Language.* ♦2 (0-1). Third year Honors laboratory hour.
UKR 330. *Intermediate Ukrainian Language and Literature.* ♦6 (3-0). Review of Ukrainian grammar. Advanced points of syntax. Drill in basic speech patterns by means of dialogues. Ukrainian composition and translation assignments. Vocabulary-building through reading selected texts from Ukrainian classical and current literature. Prerequisite: Ukrainian 200.
UKR 350. *Ukrainian Literature in English.* ♦6 (3-0). English translations of selected works of the major authors of Ukrainian literature from Kot-

liarevsky to the present. Note: Designed to acquaint the English-speaking student with Ukrainian literature. An Arts option for second, third, and fourth year students in all faculties. Not open to honors students in the Slavonic Department.

UKR 360. *Ukrainian Literature of the Nineteenth Century.* ♦6 (3-0). A survey of nineteenth-century Ukrainian literature prior to 1918, including Classicism, Romanticism, Realism and Impressionism. Authors discussed include I. Kotliarevsky, H. Kvitka-Osnovyanenko, T. Shevchenko, I. Franko, L. Ukrainka, M. Kotsiubynsky, and others. Essay writing in Ukrainian to provide an opportunity for analysing elements of Ukrainian grammar and style. Prerequisite: One senior Ukrainian course.

UKR 390. *Advanced Ukrainian Composition.* ♦6 (3-0). Difficult grammatical points with special emphasis on syntax and stylistics. Compositions will be based either on literary works read and discussed in class, or on the different types of Ukrainian correspondence. Students will also deliver talks in Ukrainian. Prerequisite: Two senior Ukrainian courses.

UKR 400. *Ukrainian Literature of the Twentieth Century.* ♦6 (3-0). Soviet Ukrainian literature with emphasis on the Literary Renaissance of the 1920's, and some treatment of Ukrainian literature abroad. Selected works of P. Tychyna, M. Rylsky, M. Khvylovy, Yu. Yanovsky, Ye. Malaniuk, Yu. Klen, M. Stelmakh, and others. Composition of papers in Ukrainian with special attention to syntax and stylistics. Prerequisite: Two senior Ukrainian courses excluding Ukrainian 350.

UKR 403. *Practical Study of the Ukrainian Language.* ♦2 (0-1). Fourth year Honors laboratory hour.

UKR 420. *History of the Ukrainian Language.* ♦6 (3-0). Prerequisite: One senior Ukrainian course.

UKR 460. *T. H. Shevchenko.* ♦6 (3-0). Prerequisite: Two senior Ukrainian courses.

## 44.40.3 / HONORS AND GRADUATE COURSES

UKR 530. *L. Ukrainka.* ♦6 (3-0). Prerequisite: Three senior Ukrainian courses.

UKR 610. *Old Ukrainian Literature.* ♦3 (Second Term, 3-0).

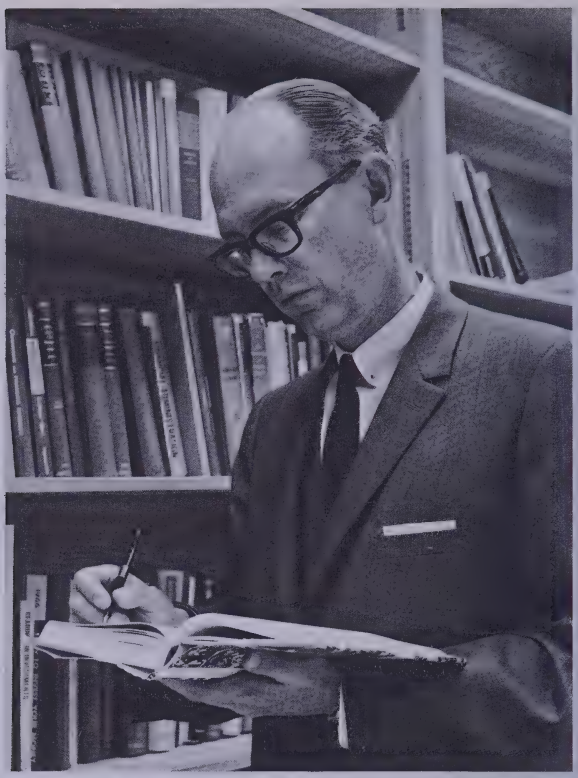
UKR 616. *I. Franko.* ♦6 (3-0). Prerequisite: Three senior Ukrainian courses.

UKR 630. *Seminar on Soviet Ukrainian Novelists.* ♦6 (3s-0). Detailed treatment of several representative Soviet Ukrainian novels. Students will present papers on approved topics. Prerequisite: Two senior Ukrainian courses.

UKR 699. *Conference Course.* A detailed study of some great author or a literary problem or period not dealt with in the other honors and graduate courses. Designed to meet the needs of individual honors or graduate students.

*Professor L. C. Leitch, Acting Dean of the Faculty of Business Administration and Commerce.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*



# *Faculty of Business Administration and Commerce*

## 51 / INTRODUCTORY

### 51.1 / *Members of the Faculty*

#### 51.1.1 / OFFICERS OF THE FACULTY

*Acting Dean*
L. C. LEITCH, M.B.A.

#### 51.1.2 / DIVISION OF BUSINESS ANALYSIS

*Associate Professor and Acting Chairman*
D. GOODALE, M.B.A.

*Professor*
P. R. WINTERS, Ph.D.

*Associate Professors*
D. H. BENT, M.Sc.
H. W. FORD, B.Com.
B. M. HARNDEN, M.B.A.
L. S. ROSEN, Ph.D.

*Assistant Professors*
R. A. DENHAM, M.B.A.
H. A. KENNEDY, M.B.A.
W. SHER, Ph.D.

#### 51.1.3 / DIVISION OF BUSINESS OPERATIONS

*Professor and Chairman*
L. C. LEITCH, M.B.A.

*Associate Professors*
C. C. MONTGOMERY, Ph.D.
B. ROLLINS, B.Com. (on leave, 1968-69)
D. N. THOMPSON, M.B.A.

*Assistant Professor*
M. BARTELL, M.B.A.

#### 51.1.4 / DIVISION OF BUSINESS POLICIES

*Associate Professor and Chairman*
C. A. LEE, M.B.A.

*Professor*
H. HARRIES, Ph.D.

*Visiting Professor*
D. J. HICKSON

*Associate Professors*
C. R. HININGS, B.A.
C. G. HOSKINS, Ph.D.
A. G. PERRONI, M.B.A.
G. B. RESCHENTHALER, M.A.
R. E. SCHNECK, D.B.A.
E. S. SHIHADEH, Ph.D.
C. B. WILLIAMS, Ph.D.

*Assistant Professor*
J. D. MUIR, M.B.A. (on leave, 1968-69)

#### 51.1.5 / ADDITIONAL MEMBERS OF FACULTY COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Professors*
W. D. GAINER, Ph.D. (Economics)
A. R. THOMPSON, LL.M. (Law)

*Associate Professors*
(Miss) G. M. FARMER, Ph.D. (Education)
D. PANAR, M.Sc. (Engineering)

*Assistant Professor*
R. G. SINCLAIR, Ph.D. (Mathematics)

*Representative of the Institute of Chartered Accountants in Alberta*
R. G. HARRIS

*Registrar of the University*
A. D. CAIRNS, B.A.

### 51.2 / *Advisory Committee to the Faculty*

S. BELZBERG, President, City Savings & Trust Co.
E. CHRISTENSON, Partner, Thorne, Gunn, Helliwell & Christenson.
G. R. GRAHAM, Vice-President—Mountain Region, Canadian National Railways.
E. A. D. McCUAIG, Q.C., Partner, McCuaig, McCuaig, Desrochers, Bechingham & McDonald.
H. H. MILLAR, President, Western Construction & Lumber Co. Ltd.
I. TELMER, Manager, (retired), Hudson's Bay Company.
J. M. TWEDDLE, Finance Commissioner, The City of Edmonton.
W. H. YOUNG, Plant Manager, Sherritt Gordon Mines Limited.
W. S. ZIEGLER, President, Inland Cement Company Limited.

To keep staff and students informed about latest trends in business and industry, a group of active leaders in the administration and direction of business enterprises have been invited periodically to meet with the academic staff of the Faculty. These members are appointed by the Board of Governors upon nomination by the President of the University and the Dean of the Faculty of Business Administration and Commerce.

## 51.3 / *General Information*

Education for business management is a lifelong process. Universities can make their greatest contribution to this process by teaching the fields of knowledge which underlie the practice of business. Details of current business practice, though important, can best be taught by business itself and learned through experience.

Accordingly, in the first two years of the Bachelor of Commerce program, the student will take courses in the basic disciplines. Later he will be taught how this basic knowledge may be applied most effectively to the solution of the various problems of business in a general program or in a specialization of his choice which may be selected from the fields of economics, accounting, marketing, production, finance or industrial relations.

In addition to its academic program, the Faculty makes every effort to give students opportunities to meet with business leaders and discuss practical problems of business management. In particular, an annual Student Business Day is held during the month of November, at which leaders in the business community are invited to participate.

## 51.4 / *Commerce Honors Society*

The Commerce Honors Society organizes and sponsors meetings of the Commerce Forum at which it invites outstanding people from within the University and outside it to discuss matters of general educational interest. Membership in the Commerce Honors Society is restricted to students in the final three years of the program whose personality, ability and academic record are meritorious. Applications for membership in the Commerce Honors Society must be submitted on the approved forms to the Dean's secretary by October 10.

# 52 / FACULTY REGULATIONS

## 52.1 / *Admission*

Admission requirements for the Faculty of Business Administration and Commerce are set out in § § 13.1 and 13.4 of The University Regulations section of the Calendar.

## 52.2 / *Academic Standings and Graduation*

(1) Promotion of the student from the first to the second year is contingent on the satisfactory completion in one year of a first year program of normal weight. The regulation applies also to students transferring from other universities.

(2) Students must either pass eight full courses with a grade of 6, of which not fewer than four must have been courses taken in the third and fourth years, or obtain a grade-point average of at least 5.0 over the last three years of the program.

(3) If a grade of 3 is obtained in a course, credit will be granted if all the following conditions are met:

(i) Grade-point average for year is 5.50 or higher.

(ii) The course is not a prerequisite to another one in the student's program.

(iii) The student does not have more than two grades of 3 in his degree program.

If any of the above conditions are not fulfilled the student must write supplementals to obtain credit.

(4) The Faculty of Business Administration and Commerce believes that it is important that each student have work experience in industry before graduation. This experience may have been obtained before entering University. In February of each year the student will be asked to describe the work he has done. In cases where the experience does not meet the requirements of the Faculty he will be advised.

(5) All third year students must attend a special Banff Seminar which will be scheduled during the latter part of the academic year.

(6) Students' attention is directed to the February and July deadlines in the Academic Schedule regarding application for Bachelor of Commerce degrees to be awarded at Spring and Fall Convocations.

# 53 / PROGRAMS OF STUDY

## 53.1 / *The Degree of Bachelor of Commerce*

### 53.1.1 / GENERAL INFORMATION

The undergraduate curriculum in the Faculty of Business Administration and Commerce consists of a four-year program leading to the Bachelor of Commerce degree. During the third and fourth years of the program the student may pursue a general course or he may major in Economics, Accounting, Industrial Relations, Finance, Production or Marketing.

Courses in the first two years of the program are offered from time to time in the Summer Session and Evening Credit Program. The final two years of the program may be taken only in the regular Winter Session.

### 53.1.2 / PROGRAM OF COURSES

*First Year*

Accounting 202
Business 202
Economics 200
English 210
Mathematics 240
Approved Arts or Science option
Physical Education

*Second Year*

Accounting 204
Business 322
Business 332
Business 357
Business Statistics 308
Computing Science 352
Mathematics 243
Psychology 202

*Third Year*

Business 302
Business 354 or 355
Business 310
Business 312
Finance 304
Industrial Relations 304
Marketing 304
Production 304
Approved option

*Fourth Year*

Business 400
Arts or Science option
Three Economics and Commerce options, of which not more than two will be from the speciality.

NOTE: Accounting majors are required to take: Accounting 202, 204, 302, 304, 402, 404, 406, and one of 408, 410, or 412.

## 53.2 / *Graduate Study*

The Master of Business Administration program is designed for students who desire a broad preparation for management positions in industry and government. Its emphasis is upon breadth of training rather than specialization. The central concept of the M.B.A. program is the role of the administrator. Although functional areas of business such as finance, marketing and production are important elements in the program, they are only a part of, and subsidiary to the primary purpose of the program—which is education for general managerial and administrative responsibilities.

The program provides professional training in business administration for outstanding students regardless of their undergraduate field of study. Details are given in § 204.11 of the Graduate Studies section of the Calendar.

For further information please contact:

The Dean
Faculty of Business Administration and Commerce
The University of Alberta
Edmonton, Alberta

# 54 / DETAILS OF COURSES

## 54.1 / *General Information*

Courses open to students in the Faculty of Business Administration and Commerce are listed here in alphabetical order, whether they are offered by the Faculty of Business Administration and Commerce or by another faculty or school.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Following the title of the course is the symbol "•" standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages. An ordinary full-year course is weighted 6. A half-course is normally

*The Commerce Rodeo is organized each fall by students in the Faculty, and draws participants from colleges throughout Western Canada and the neighboring states*

weighted 3. Some honors and graduate courses involving research may vary in weight according to the length and difficulty of the research project. Some courses are offered for credit only, and carry no weight.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours, respectively, required by the course in a week. When they appear, the symbol "s" denotes seminar hours and the symbol "L" denotes combined lecture-laboratory hours. The expression "3/2" means three hours of instruction every second week. The hours of instruction for a full course are the same in both terms unless otherwise indicated. If the course is a half-course, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 54.2 / *Accounting*

ACCTG 202. *Introductory Accounting.* ♦3 (either term, 3-2). Postulates, principles, the accounting cycle, capital and income measurement, financial statement preparation and analysis; emphasis on reporting to shareholders, creditors and other external decision makers.

ACCTG 204. *Managerial Information and Control Systems.* ♦3 (either term, 3-2). Corporate goals, planning and control concepts, cost accumulation for pricing purposes, and product costing.

ACCTG 270. *Legal Accounting.* ♦5 (2-0). Areas of accounting useful to a practising solicitor. Note: For non-Commerce students only.

ACCTG 302. *Intermediate Financial Accounting.* ♦3 (First Term, 3-2). Several economic and accounting concepts of capital and income with illustrations using selected assets, liabilities, and owners' equity accounts. Traditional accounting measures, price-level adjustments, and selected replacement cost definitions.

ACCTG 304. *Accounting Information Systems.* ♦3 (Second Term, 3-2). Introduction to total information systems with emphasis on the role of accounting, using both conceptual reviews and mechanical case material pertaining to decision-making by owners, creditors, and managers.

ACCTG 402. *Accounting Theory.* ♦3 (First Term, 3-0). Topics in accounting history and current financial accounting thought.

ACCTG 404. *Intermediate Managerial Control Concepts.* ♦3 (Second Term, 3-2). Accounting for managerial decision making. Emphasis on cost and revenue accumulation for control and pricing problems as well as on product costing.

ACCTG 406. *Advanced Managerial Control Concepts.* ♦3 (Second Term, 3-2). Current research and cases in managerial accounting.

ACCTG 408. *Advanced Accounting Information Systems.* ♦3 (Second Term, 3-0). Managerial decision-making with stress on the role of accounting measurements. Emphasis on the use of the computer in processing data.

ACCTG 410. *Research in Accounting.* ♦3 (Second Term, 3-0). Preparation of research reports on topics of interest.

ACCTG 412. *Auditing History, Theory, and Current Thought.* ♦3 (First Term, 3-0). Internal and external auditing history and philosophy. Functional or operational auditing, the nature of evidence, ethics, and independence.

ACCTG 561. *Seminar in Financial Accounting Theory.* ♦3 (First Term, 3-0). Topics in accounting history and current financial accounting thought. Note: Open only to students registered in the Faculty of Graduate Studies.

ACCTG 562. *Seminar in Managerial Accounting.* ♦3 (Second Term, 3-0). Managerial accounting concepts and current research. Note: Open only to students registered in the Faculty of Graduate Studies.

## 54.3 / *Agricultural Engineering*

AG EN 342. *Work Study.* ♦3 (either term, 3-0). Time and motion techniques with critical path scheduling. Note: Not offered to students from the Faculty of Agriculture.

## 54.4 / *Business*

BUS 202. *Introduction to Business.* ♦6 (3-0). Survey of the place of business in society.

BUS 300. *Administrative Principles.* ♦6 (3-0). Functions of management — planning, organization, staffing, directing, controlling. Note: for non-Commerce students only.

BUS 302. *Organizational Behavior.* ♦5 (2-0). An analytical approach to organizational behavior using the tools of the behavioral sciences.

BUS 308. *Introductory Business Statistics.* ♦3 (either term, 3-3). Application of statistical methods to business problems. Measures of location and dispersion. Elementary probability. Binomial, normal and Poisson distributions. Prediction techniques. Index numbers. Time series. Prerequisite: Mathematics 240 or equivalent.

BUS 310. *Commercial Law.* ♦3 (First Term, 3-0). An introduction.

BUS 312. *Government and Business.* ♦3 (Second Term, 3-0). Federal and Provincial Regulation of the economic system.

BUS 322. *Managerial Economics.* ♦6 (2-2s). Internal factors influencing prices, costs, output, and growth of a business enterprise. Prerequisite: Economics 200.

BUS 332. *Managerial Economics.* ♦6 (2-2s). External factors influencing prices, costs, output, and growth of a business enterprise. Developments in organization analysis. Prerequisite: Economics 200.

BUS 354. *Operations Analysis.* ♦6 (3-0). Quantitative approach to business problems. Theory and application. Prequisite: Mathematics 243, Business Statistics 308 and one other approved half-course in Mathematics or Statistics.

BUS 355. *Quantitative Methods.* ♦6 (3-0). Introduction to analytical methods for business decisions. Prerequisite: Business Statistics 308 and Mathematics 243.

BUS 357. *Introduction to System Analysis.* ♦3 (3-3). Organization of data for survey research and analysis of survey data with library programs; computer-aided planning tools: e.g. linear programming, project net work diagrams; simulation procedures and languages using library programs; the role of the computer in management information systems. Prerequisite: Computing Science 352.

BUS 400. *Business Policy.* ♦6 (3-0). Policy-making in business, government, and society with emphasis upon the application of the principles and techniques acquired in the basic courses.

BUS 440. *Economic Problems.* ♦6 (3-0). Current economic problems in business.

NOTE: Courses numbered Business 452 to 565 inclusive are open only to students registered in the Faculty of Graduate Studies.

BUS 452. *Introductory Financial Accounting.* ♦3 (First Term, 3-2). Emphasis on reporting to shareholders, creditors and other external decision makers.

BUS 453. *Managerial Control Systems.* ♦3 (Second Term, 3-2). An introduction to managerial information and control systems. Cost and revenue accumulation for pricing, control, and product costing purposes.

BUS 456. *Finance.* ♦3 (Second Term, 3-0). The management of funds and business operations from the viewpoint of the chief financial officer.

BUS 458. *Marketing.* ♦3 (First Term, 3-0). The management of marketing operations.

BUS 459. *Production.* ♦3 (First Term, 3-0). The Management of production operations.

BUS 460. *Research Methods.* ♦3 (either term, 3-0). The principles and techniques of business research.

BUS 461. *Elementary Statistics.* ♦3 (First Term, 3-0). Elementary statistical methods applied to business decisions.

BUS 462. *Business Statistics.* ♦3 (Second Term, 3-0). Statistical methods applied to business decisions.

BUS 463. *Business Analysis.* ♦3 (First Term, 3-0). Forecasting for the business firm.

BUS 464. *Business Analysis.* ♦3 (Second Term, 3-0). Forecasting for industry.

BUS 551. *Administrative Policy.* ♦6 (3-0). Interpersonal relations, small group functioning and formal organization.

BUS 555. *Business Policy.* ♦3 (First Term, 3-0). Inter-firm and intra-firm relationships.

BUS 556. *Business Policy.* ♦3 (Second Term, 3-0). The social, political, cultural, and ethical environment of business with emphasis on the responsibilities of business leadership.

BUS 565. *Business Analysis.* ♦6 (3-0). Advanced seminar in the use of micro- and macro-economic and multiple correlation analysis for business and economic research.

## 54.5 / *Computing Science*

CMPUT 352. *Introduction to Computer and Related Equipment.* ♦3 (First Term, 3-3). Introduction to computers and related equipment: unit record machines, telecommunications equipment, peripheral devices; the orderly organization and storage of data, preparation of programs and input data; types and costs of computers; machine languages, assemblers, compilers; programming languages: FORTRAN, COBOL, PL-1; introduction to time-shared systems.

## 54.6 / *Economics*

ECON 200. *Principles of Economics.* ♦6 (3-0). A survey of various aspects of economics; the nature of economic problems and systems; the functions of money; commercial and central banking; national income analysis; monetary and fiscal policy; pricing under competitive and monopolistic conditions; selected topics in analysis and policy. Prerequisite: Mathematics 30 and 100.

ECON 320. *International Economics.* ♦6 (3-0). The basis of international trade, balance of payments problems, and related matters, analysed theoretically and in relation to questions of economic policy. The development of the international economy since 1500, with emphasis on events since the Second World War. Prerequisite: Economics 200.

ECON 330. *Labor Economics.* ♦6 (3-0). The development and dynamics of trade unions, collective bargaining and government legislation. Supply of and demand for labor, wage determination, income shares and the structure of employment and unemployment. Prerequisite: Economics 200.

ECON 340. *Money and Banking.* ♦6 (3-0). The principles of money, monetary systems, commercial banking, central banking, monetary theory and policy, foreign exchange. Prerequisite: Economics 200.

ECON 350. *Public Finance.* ♦6 (3-0). The conditions under which individual economic goals can be maximized through non-market mechanisms; the allocation of resources, redistribution of income, and stabilization of the level of resource utilization; taxes and the goals of a tax system; government expenditure and revenues; compensatory fiscal and debt policies. Prerequisite: Economics 200.

ECON 380. *Macro-Economic Analysis.* ♦6 (3-0). National income concepts and determination; the theory of aggregate consumption and investment; business cycle and growth applications of aggregate analysis. Prerequisite: Economics 200.

ECON 401. *Economic Analysis.* ♦6 (3-0). Micro- and macro-economic anlysis; price and distribution theory; aggregate consumption, investment and income determination. Prerequisite: Economics 301.

## 54.7 / *English*

ENGL 210. *English Language and Literature.* ♦6 (3-0). Designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

## 54.8 / *Finance*

FIN 304. *Business Finance.* ♦3 (either term, 3-0). Introduction to corporate financial decision making and the administration of a going concern.

FIN 400. *Risk Management.* ♦6 (3-0). Nature of risk and uncertainty and the methods of meeting risk. Prerequisite: Business 322 and Business 332 or equivalent.

FIN 410. *Investment Principles; Security Analysis.* ♦6 (3-0). Theories of investment with special

reference to types of securities, prices and market operation. Analytical techniques in the selection of securities.

FIN 421. *Taxation and Estate Planning.* ♦3 (First Term, 3-0). Current estate planning practices, with particular references to life insurance, succession duties, corporate and personal income taxes.

FIN 431. *Property Valuation.* ♦3 (Second Term, 3-0). Concepts and methods in property valuation.

FIN 432. *Capital Investment.* ♦3 (either term, 3-0). Capital budgeting and the determination of the cost of capital to the firm. Prerequisite: Business 332 or consent of instructor.

FIN 451. *Location Analysis.* ♦3 (First Term, 3-0). Location factors in the structure and pattern of land uses.

FIN 452. *Urban Economics.* ♦3 (Second Term, 3-0). The economic characteristics of real property; the fundamentals of urban growth.

FIN 561. *Advanced Seminar in Finance.* ♦6 (3-0). Note: Open only to students registered in the Faculty of Graduate Studies.

## 54.9 / *French*

Department of Romance Languages

FREN 100. *Beginners' French.* ♦6 (5-0). Designed to enable students entering with complete matriculation but without French to begin their study of this language in the University. Note: Normally, students will go from French 100 to French 200.

FREN 200. *First Year University French.* ♦6 (3-1). Intensive training in spoken and written French, including grammar, composition and literature.

## 54.10 / *Geography*

GEOG 302. *Economic Geography.* ♦6 (3-0). Analysis of the locational characteristics of economic activities throughout the world. Renewable and non-renewable resources and raw materials, agricultural, extractive, manufacturing and service industries reviewed systematically and in place. The significance of location and spatial arrangement with respect to the relationships between geography and economics.

GEOG 410. *Geography in Planning.* ♦6 (1s-2L). Selected historical, theoretical, and practical aspects of land use planning in various parts of the world. Physical and cultural aspects of planning projects and problems; appraisal of planning techniques. Prerequisite: Consent of the Department.

GEOG 416. *Industrial Geography.* ♦6 (3-3). A systematic survey of manufacturing, and of raw materials, transport, energy, and markets in their areal context and in relation to manufacturing. Geographic analysis of the character of representative areas including both major manufacturing regions and underdeveloped territories. Prerequisite: Geography 302, or consent of the Department.

GEOG 428. *Canada.* ♦6 (3-3). A survey of the natural features, settlement patterns, and economic development in Canada. Special problems of regional development in Eastern and Western Canada. Prerequisite: Consent of the Department. Note: Students may not receive credit for both Geography 406 and 428.

## 54.11 / *Geology*

GEOL 201. *General Geology.* ♦6 (3-3). An introduction to the study of the Earth's nature, history and origin, of the various processes which operate on and below its surface, and of the plants and animals which have lived on its surface, with emphasis on the following topics: composition, structure and state of the Earth; minerals and rocks; ground water and water supply; weathering and soils; erosion; deposition; igneous activity; mountain building; geologic history; fossils.

GEOL 301. *Earth Science.* ♦6 (3-0). History of the development of geology as a natural science; modern trends in earth science; selected topics of current interest in physical and historical geology, such as continental drift, glaciation, formation of mountains and ocean basins, geologic time, history of life on the earth; field trips, demonstrations. Note: Not available to students in the Faculty of Science, or those who already have Geology 201 or equivalent.

GEOL 302. *Geology and Mineral Deposits of Canada.* ♦6 (3-0). The geologic regions of Canada; their stratigraphy, structure and mineral deposits. Extensive use of maps, sections, suites of demonstration mineral and rocks, and assigned readings. Prerequisite: Geology 201 or 301. Note: Designed for students not majoring in Geology.

## 54.12 / *German*

GERM 100. *Beginners' German.* ♦6 (3-2). Designed to impart practical skill in spoken and written German. The oral approach will be followed. The Department's language laboratory will be used for drill and will also be available to students for individual practice.

GERM 200. *First Year University German.* ♦6 (3-1). Designed to develop ability in speaking, reading and writing German, using modern short stories, cultural readers, and audio-visual aids. Prerequisite: German 30, German 100 or the equivalent.

## 54.13 / *Greek*

Department of Classics

GREEK 100. *Beginners' Greek.* ♦6 (5-0). Essential grammar and vocabulary, the reading of easy Greek and simple sentences for translation into Greek.

## 54.14 / *History*

HIST 370. *Canada.* ♦6 (3-0). A survey of the political and social history of Canada.

## 54.15 / *Industrial Relations*

I R 304. *Industrial Relations.* ♦3 (either term, 3-0). A survey of personnel administration, labor relations, and human relations.

I R 402. *Labor Legislation.* ♦6 (3-0). History, philosophy, and significance of federal and provincial labor legislation.

I R 410. *Labor Relations.* ♦6 (3-0). A detailed examination of negotiation techniques and of the day-to-day administration of the collective agreement.

I R 420. *Personnel Administration.* ♦6 (3-0). Procedures for employee recruitment, selection, placement, and training; job evaluation, merit rating, wage structure, and employee communications.

I R 430. *Human Relations.* ♦6 (3-0). Work environment and motivation.

I R 564. *Advanced Seminar in Industrial Relations.* ♦6 (3-0). Note: Open only to students registered in the Faculty of Graduate Studies.

## 54.16 / *Italian*

Department of Romance Languages

ITAL 100. *Beginners' Italian.* ♦6 (3-2). Italian grammar and pronunciation. Readings of easy texts dealing with different aspects of Italian culture.

## 54.17 / *Latin*

Department of Classics

LATIN 100. *Beginners' Latin.* ♦6 (5-0). Essentials of grammar, syntax, the reading of easy Latin and prose composition. Secondary emphasis on the connection of English with Latin.

LATIN 200. *Latin Authors.* ♦6 (3-0). Practice in the reading of Latin and with the writing of simple Latin sentences. Note: For students with matriculation in Latin 30 or with Latin 100.

## 54.18 / *Marketing*

MARK 304. *Fundamentals of Marketing.* ♦3 (either term, 3-0). The evaluation of marketing in the economy. Marketing structure, organization and behavior; marketing functions.

MARK 401. *Marketing Research.* ♦6 (3-0). Nature and significance of marketing research. Marketing research methods; investigation and analysis of specific marketing research problems.

MARK 403. *Communication Processes in Marketing.* ♦3 (First Term, 3-0). Basic concepts and functions of advertising and communication in the economy; consumer motivation; measurement of communication effectiveness.

MARK 405. *Quantatitve Techniques in Marketing Analysis.* ♦3 (either term, 3-0). Mathematical concepts and techniques that can be utilized in the analysis and solution of marketing management problems.

MARK 407. *Marketing Management.* ♦3 (First Term, 3-0). Product and price policies, management of the marketing organization. Emphasis on case analysis of marketing programs, plus readings in the literature.

MARK 408. *Marketing Decision Simulation.* ♦3 (Second Term, 3-0). Marketing decision making in a dynamic simulated environment. Emphasis on a computerized marketing decision game, plus readings in the literature.

MARK 411. *Marketing Policies and Problems.* ♦3 (either term, 3-0). Special topics in marketing, to be announced in advance by the instructor.

MARK 413. *Seminar in Business Logistics and Traffic Management.* ♦3 (either term, 3-0). Problems in physical distribution and transportation; analysis of governmental subsidies and regulations.

MARK 415. *Seminar in Marketing Channels.* ♦3 (First Term, 3-0). Marketing organization at the retail and wholesale levels of the marketing channel. Specialization and integration of marketing organization; problems of "orderly marketing".

MARK 417. *Seminar in Sales Management.* ♦3 (either term, 3-0). Sales analysis and forecasting; planning and policy determination; territorial and cost analysis.

MARK 419. *Seminar in International Business.* ♦3 (either term, 3-0). Tools of international economic theory applicable to problems in international business; commercial and financial policies for the multi-national firm in industrial and developing countries.

MARK 450. *Individual Research in Marketing Problems.* ♦3 (either term, 3-0). Special study for advanced undergraduates. Prerequisite: Consent of instructor.

MARK 563. *Advanced Seminar in Marketing.* ♦6 (3-0). Note: Open only to students registered in the Faculty of Graduate Studies.

## 54.19 / *Mathematics*

MATH 180. *Trigonometry and Polynomial Calculus.* ♦6 (4-0). Trigonometric functions and identities. Solution of triangles. Simple algebraic curves. Differentiation and integration of elementary functions. Applications. Prerequisite: Mathematics 30 or its equivalent.

MATH 201. *Introductory Calculus.* ♦6 (5-0). Rates of change. Differentiation and integration of simple functions. Applications. Analytic geometry of the conic sections. Exponential, logarithmic and trigonometric functions. Prerequisite: Mathematics 30 and 31 or their equivalents. Corequisite: Some students lacking Mathematics 31 or its equivalent may take Mathematics 201 by taking Mathematics 101 concurrently. (See the conditions under which a student may take Mathematics 101.)

MATH 220. *Elementary Calculus.* ♦6 (3-0). Differentiation and integration of trignometric functions. Polar co-ordinates. Logarithmic and exponential functions. Conic sections. Areas and volumes. Prerequisite: Mathematics 180.

MATH 240. *Algebra and Elementary Calculus.* ♦3 (either term, 3-1). Elementary algebraic operations. Graphs of polynomial functions. Exponents and logarithms. Permutations and combinations. The Binomial Theorem. Arithmetic and geometric progressions. Calculus of polynomial functions. Maxima and minima. Prerequisite: Mathematics 30 or equivalent. Note: Not available for first year Arts or Science. This course is designed as a prerequisite for Statistics 241.

MATH 243. *Linear Algebra.* ♦3 (First Term, 3-0). Vector and matric operations. Linear systems of equations, dimension; axiomatic definition of vector space, constructive solution of linear equations, computation of inverses. Linear inequalities, convex sets, introduction to linear programming. Binary relations: equivalence, order, graphs. Invariants, canonical forms, eigenvalues and quadratic forms. Finite Markov chains. Prerequisite: Mathematics 30 or equivalent.

MATH 340. *Calculus and Numerical Analysis.* ♦3 (Second Term, 3-0). Calculus of rational, logarithmic and exponential functions. Functions of several variables. Partial derivatives and extreme values. Linear difference equations with constant coefficients. Interpolation procedures. Systems of linear equations. Numerical integration. Numerical solutions of equations. Prerequisite: Mathematics 240 or 242 or equivalent.

## 54.20 / *Physical Education*

PHYS ED 218. *Activity Course—Men.* ♦0 (0-2). Tests in fitness and aquatics in the First Term, followed by student-selected recreational activities. Note: Course required of all first-year men.

PHYS ED 228. *Activity Course—Women.* ♦0 (0-2). Foundations of Physical Education with emphasis on fitness, followed by two electives in recreational activities. Note: Course required of all first-year women.

## 54.21 / *Physical Science*

PH SC 341. *Physical Science.* ♦6 (3-0). A course designed to give students in B.A. and B.Ed. programs some appreciation of fundamental ideas and methods in the physical sciences, their history and development, modern trends in these fields, and their relation to other disciplines. Illustrative material will be taken from Physics, Chemistry, Astronomy, and Geology. Notes: (1) May not be used for credit towards the B.Sc. degree. (2) Not open to first year students. (3) May not be taken for credit by students who have credit in Physics 100 or 200.

## 54.22 / *Political Science*

POL SC 200. *Elements of Political Science.* ♦6 (3-0). The principles and practices of the modern government, with emphasis on democratic constitutional government. Topics include the nature of government; types of constitutions; the functions and composition of the legislature; executive, and judiciary; representation; political parties and pressure groups.

POL SC 310. *History of Political Thought.* ♦6 (3-0). An historical and critical survey of the development of political and social philosophy from Ancient Greece to the present time, with selected readings from major political writers.

POL SC 320. *Government of Canada.* ♦6 (3-0). The structure and functions of Canadian government and politics.

## 54.23 / *Production*

PROD 304. *Fundamentals of Production.* ♦3 (either term, 3-0). Introduction to production management.

PROD 310. *Production Management.* ♦6 (3-0). Production management with respect to the basic functional areas.

PROD 400. *Quantitative Analysis for Management.* ♦6 (3-0). A quantitative approach to decision making in management. Prerequisites: Computing Science 351 and Business 354.

PROD 410. *Plant Location, Layout, Organization and Control.* ♦6 (3-0). A study of the factors influencing plant location, layout, organization, and control.

PROD 421. *Motion and Time Study.* ♦3 (Second Term, 3-0).

PROD 430. *Advanced Production Management.* ♦6 (3-0). Problems in planning and controlling production operations. Prerequisites: Computing Science 351 and Business 355.

PROD 562. *Advanced Seminar in Production.* ♦6 (3-0). Note: Open only to students registered in the Faculty of Graduate Studies.

## 54.24 / *Psychology*

PSYCO 202. *Introduction to General Psychology.* ♦6 (3-0). A survey of problems, methods, and principles in various fields of psychology.

PSYCO 320. *Psychology Applied to Business and Industry.* ♦6 (3-0).

## 54.25 / *Sociology*

SOC 202. *Introductory Sociology.* ♦6 (3-0). An analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society analysed in terms of its structure, culture, and social ranking schemes. The interrelationships between the various institutions (e.g. family, church, school, government). The processes whereby the individual is socialized into society; the sources of conformist and nonconformist behavior. Note: Third-year or more advanced students are encouraged to take Sociology 402 rather than 202.

SOC 320. *Social Problems.* ♦6 (3-0). Deviant behavior (e.g. crime, juvenile delinquency, drug addiction) and social disorganization, including world population problems, urban and rural problems, industrial and other problems.

SOC 361. *Social Organization.* ♦3 (either term, 3-0). Social systems, their components, interrelations, and the bases of social differentiation and integration. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 403. *Principles of Sociology.* ♦3 (either term, 3-0). Basic concepts and principles of Sociology for students with advanced standing. Prerequisite: Senior or graduate standing. Note: Not open to Sociology majors and carries no credit for those with Sociology 202 credit.

SOC 460. *Social Organization — Organizational Theory.* ♦3 (either term, 3-0). Models of social organization; the units of social structure; the bases of social integration, social control, and social change. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 465. *Formal Organization.* ♦3 (either term, 3-0). The nature and implications of formal organizations, including theories and studies of bureaucracy. Prerequisite: Sociology 202 or 403 or consent of the Department.

## 54.26 / *Spanish*

Department of Romance Languages

SPAN 100. *Beginners' Spanish.* ♦6 (3-2). Spanish grammar and pronunciation; an introduction to Spanish and Hispano-American civilization.

## 54.27 / *Statistics*

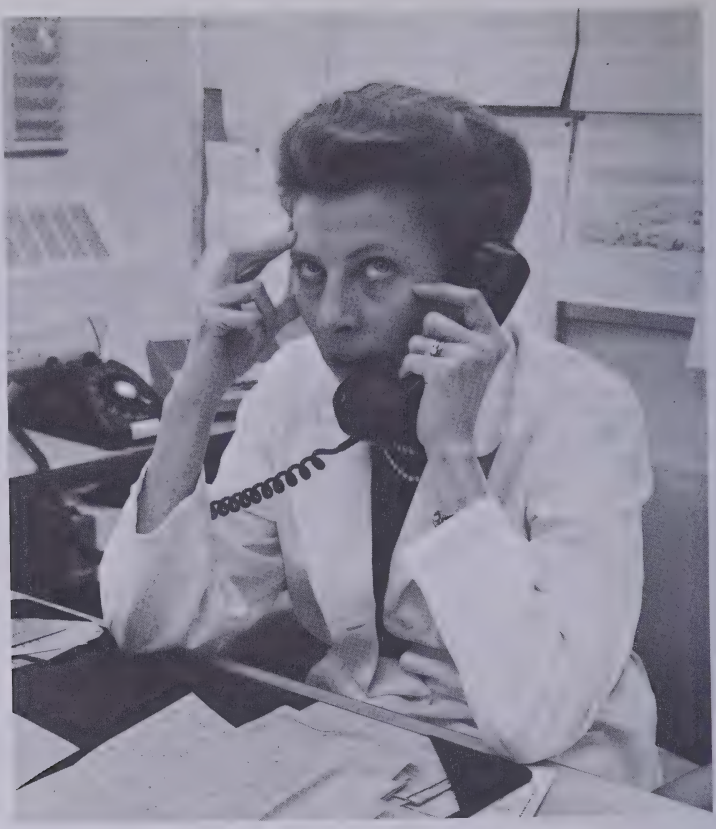
Department of Mathematics

STAT 241. *Introductory Probability.* ♦3 (Second Term, 3-1). Probability models. Sampling. Product models. Conditional probability. Random variables. Special distributions. Multivariate distributions. Prerequisite: Mathematics 240 or equivalent.

STAT 341. *Statistical Methods.* ♦3 (First Term, 3-0). Sampling distributions. Point and interval estimations. Desirable properties of estimates. Hypothesis testing. Normal, chi-square, t-and F-tests. Types of error. Linear models: analysis of variance, regression, multiple comparison, simple designs. Prerequisite: Statistics 241, or equivalent.

*Mrs. Margaret MacLean, Director of the School of Dental Hygiene.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*



# School of Dental Hygiene

## 61 / INTRODUCTORY

### 61.1 / *Members of the School*

#### 61.1.1 / ACADEMIC STAFF

*Associate Professor and Director*
(Mrs.) M. BERRY MacLEAN

*Lecturer and Clinical Supervisor*
(Miss) V. A. LOGIE

*Lecturer*
(Mrs.) D. J. THOMAS

*Sessional Lecturers*
(Mrs.) M. A. BELL
(Mrs.) B. E. BROWN
(Miss) M. L. GALAC

*Sessional Instructors*
(Mrs.) M. J. HAW
(Miss) A. F. MACINTOSH

#### 61.1.2 / COUNCIL OF THE SCHOOL OF DENTAL HYGIENE

NOTE: In 1968-69 the School of Dental Hygiene will be administered by the Council of the Faculty of Dentistry, the members of which in addition to the full-time staff of the Faculty of Dentistry and the School of Dental Hygiene, are listed below.

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Dean of the Faculty of Dentistry*
H. R. MacLEAN, D.D.S., F.A.C.D., F.I.C.D.

*Dean of the Faculty of Medicine*
W. C. MacKENZIE, M.D., M.S., F.A.C.S., F.R.C.S.(C), Hon. F.R.C.S.

*Director of the School of Dental Hygiene*
M. BERRY MacLEAN, B.Sc., B.Sc.D.H.

*Professors*
G. B. FRANK, Ph.D. (Pharmacology)
T. S. LEESON, M.D. (Anatomy)
J. W. MACGREGOR, M.D., F.R.C.P. (Pathology)
M. SCHACHTER, M.D., C.M. (Physiology)

*Assistant Professor*
J. D. M. ALTON, M.D. (Plastic Surgery)

*Representative of Alberta Dental Association*
G. E. DECKER, D.D.S. (Secretary)

*Registrar of the University*
A. D. CAIRNS, B.A.

### 61.2 / *General Information*

The continuing growth of knowledge in the profession of dentistry created a need for an auxiliary capable of working with the dental team in the areas of preventive clinical services and education of the public to the principles and practices of achieving and maintaining oral health. In 1913 Dr. Alfred C. Fones organized the first formal educational program for this auxiliary, called the Dental Hygienist, at Fones' Clinic, Bridgeport, Connecticut, U.S.A. Since that time, the Schools of Dental Hygiene have grown to number more than sixty-five on the North American continent and in Europe.

Under the Dental Auxiliaries Act of 1960, a program of study for Dental Auxiliaries was initiated within the Faculty of Dentistry in 1961. In 1962, the Governors of The University of Alberta approved the establishment of the School of Dental Hygiene.

The program of study for Dental Hygienists leads to a Dental Hygiene diploma. The program for Dental Auxiliaries follows the requirements for Dental Hygiene with additional study in the subjects necessary for Dental Auxiliaries in Alberta. Students receiving financial assistance from the Provincial Department of Health will enrol in this program. Graduate Dental Auxiliaries are employed by designated local health authorities to serve with dental health teams in public health. A two-year return in service for financial assistance received is required of all graduate Dental Auxiliaries.

The ever-increasing knowledge in the area of preventive dental services, and the need and demand for such services by the public, creates a demand for Dental Hygienists far in excess of the number now available. The programs in the School of Dental Hygiene offer excellent preparation for many opportunities open to Dental Hygienists.

The School of Dental Hygiene is located in the Medical Sciences Building of The University of Alberta. Its programs benefit from the close co-operation and assistance of members of the Faculty of Dentistry and consultants from the office of the Dean of Dentistry. Courses are also offered within

the program from the Faculties of Arts, Agriculture, Education, and Medicine. The Dental Hygiene laboratories and clinics are equipped with modern facilities and afford the student an opportunity to apply knowledge, skills, and techniques for the improvement of dental health. The services offered in the Dental Hygiene Clinic are available by appointment to students at The University of Alberta and citizens of Edmonton and surrounding districts. The programs further benefit from the School's association with the Local Health Units of Alberta, the Dental Clinic at The University of Alberta Hospital, the Glenrose School Hospital for Multiple Handicapped Children, and the Department of National Health and Welfare, Indian Health Services Branch, Alberta.

The Dental Hygiene Program is approved by the Councils of Dental Education of the Canadian Dental Association and of the American Dental Association. Successful students in the School of Dental Hygiene are encouraged to write the National Board Dental Hygiene Examinations of the American Dental Association.

## 61.3 / *Licensure*

A diploma from the School of Dental Hygiene does not, in itself, confer the right to practise. Dental Auxiliaries employed in the local health units of Alberta must be registered and obtain a licence to practise as described in The Dental Auxiliaries Act of the Province of Alberta. A Dental Hygienist desiring to practise Dental Hygiene in Canada should consult the appropriate provincial licensing body as listed below:—

*Alberta*—Registrar, Alberta Dental Association, 9901-108 Street, Edmonton, Alberta.

*British Columbia*—Registrar, College of Dental Surgeons of British Columbia, 325-925 W. Georgia Street, Vancouver, British Columbia.

*Manitoba*—Registrar, The Manitoba Dental Association, 308 Kennedy Street, Winnipeg, Manitoba.

*New Brunswick*—Registrar, College of Dental Surgeons of New Brunswick, 380 St. George Street, Moncton, N.B.

*Newfoundland* — Registrar, Newfoundland Dental Association, Campbell Building, 350 Water Street, St. John's, Newfoundland.

*Nova Scotia*—Registrar, Provincial Dental Board of Nova Scotia, 2169 Gottingen Street, Halifax, Nova Scotia.

*Ontario*—Registrar-Secretary, Royal College of Dental Surgeons of Ontario, 230 St. George Street, Toronto 5, Ontario.

*Prince Edward Island*—Registrar, The Dental Association of Prince Edward Island, 162 Great George Street, Charlottetown, Prince Edward Island.

*Quebec*—Registrar, College of Dental Surgeons of the Province of Quebec, 801 Est, Rue Sherbrooke, Montreal, P.Q.

*Saskatchewan*—Registrar, The College of Dental Surgeons of Saskatchewan, 606 Canada Building, Saskatoon, Saskatchewan.

Dental Hygienists and Dental Auxiliaries are employed at all times under the supervision or direction of a fully qualified dentist.

## 61.4 / *Finance*

*Fees and Costs*

| | |
|---|---|
| Books—approximate cost | |
| First year | $175.00 |
| Second year | $100.00 |
| Instruments and uniforms—approximate cost | |
| First year | $225.00 |
| Second year | $ 50.00 |

*Uniforms*—The student will be expected to have two lab coats, two white uniforms and a pair of white oxfords. The lab coats, uniforms and shoes will be purchased under the direction of the School.

*Dental Auxiliary Bursary*—A limited number of bursaries from the Department of Public Health are available to students enrolled in the School of Dental Hygiene. Students receiving the bursaries will take the Dental Auxiliary program. Graduate Dental Auxiliaries will be expected to work for a two year period following graduation in designated health units of Alberta. Candidates who are residents of Alberta will be given priority to receive financial assistance.

The financial assistance consists of $90.00 a month during the academic years, tuition fees and a book allowance of $25.00. Prospective students wishing to apply for the bursary should complete the Form P.H.G.A. 149—application for professional training grant. The bursary forms are available from the Office of the Director of the School of Dental Hygiene or from the Director of Dental Health Services for the Province of Alberta, Department of Public Health, Administration Building, 109th Street and 98th Avenue, Edmonton, Alberta.

Additional information on financial assistance will be found in the Awards section of the Calendar.

## 62.1 / *Admission*

Admission requirements for the School of Dental Hygiene will be found in §§ 13.1 and 13.5 of the University Regulations section of the Calendar.

The Admissions Committee meets about August 20 to consider all applications for admission to the School of Dental Hygiene. During the following week, all applicants will be informed of the decision on their application—namely accepted, waiting list, or not accepted. Applicants in the categories of accepted or waiting list must reply by return mail, signifying their decision to accept or refuse the position of their application in the School of Dental Hygiene.

Registration will take place on the Tuesday immediately following Labour Day. Each successful applicant will receive a notice indicating the time and place of registration.

*Students should not come to the University until they have received an official acceptance of their application.*

## 62.2 / *Academic Standings and Graduation*

In addition to the regulations set out in § 16 of the University Regulations section of the Calendar, the following apply to students in the School of Dental Hygiene:

(1) Students in the School of Dental Hygiene may not carry a reduced academic load. If a student has been granted advanced credit in a course, it is expected the student will take an approved option in its place.

(2) Recommendations for promotion and graduation will be based on a grade of at least 4 in each subject and a weighted grade-point average of at least 5.0.

(3) Credit may be granted for a grade of 3 when the following conditions apply:

(i) The grade-point average for the year is 5.75 or higher;

(ii) not more than one such grade is granted per year;

(iii) the course is not a prerequisite or essential to the program of study.

(4) The records of all students will be reviewed at the end of each academic year by the Revisions Committee and the Council of the Faculty of Dentistry. Where a student has not met the above requirements, permission to write one or more supplemental examinations is at the discretion of the Revisions Committee and the Council of the Faculty of Dentistry. Each case will be considered on the basis of a student's yearly performance and supplemental privileges may be granted only when the grade-point average is 5.0 or better.

(5) Because of early registration, a student may be conditionally promoted pending the results of supplemental examinations written in the month of August or September. If the deficiencies are not cleared by October 1, a student may be asked to repeat the failed year or to withdraw from the School.

(6) Students seeking to repeat a failed year in the School of Dental Hygiene during the academic session immediately following the failure will be considered at the time of registration.

(7) Students seeking to repeat a failed year after an absence of one academic session or more, will be considered at the Admissions Committee meeting for that academic session.

(8) Students in the Dental Auxiliary program must satisfactorily complete the field training work.

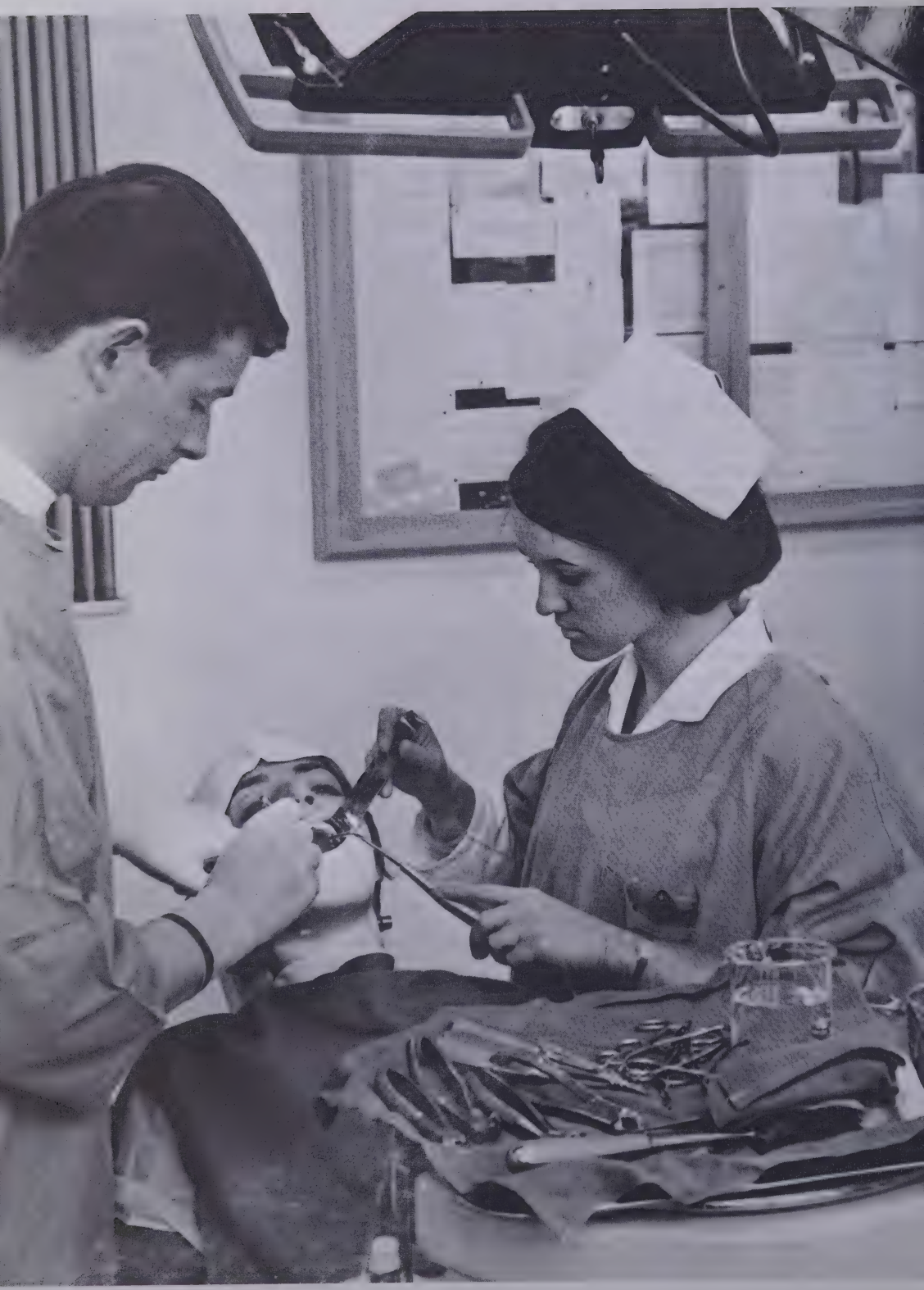
# 63 / PROGRAMS OF STUDY

## 63.1 / *Dental Auxiliary Program*

*First Year*

| | *Hours* |
|---|---|
| PUB S 201 (Public Speaking) | 30 |
| SOC 202 (Introductory Sociology) | 80 |
| D HYG 203 (Dental Anatomy) | 70 |
| D HYG 204 (Psychology) | 42 |
| D HYG 205 (Dental Roentgenology) | 15 |
| ENGL 210 (English) | 80 |
| D HYG 211 (Office Administration) | 30 |
| D HYG 212 (Clinical Dental Hygiene) | 216 |
| D HYG 213 (Anatomy and Physiology) | 116 |
| D HYG 220 (Nutrition) | 30 |
| BIOCH 221 (Biochemistry) | 84 |
| D HYG 222 (Oral Histology and Embryology) | 60 |
| D HYG 223 (Dental Materials) | 60 |
| P ED 228 (Physical Education) | 56 |
| MICRB 304 (Microbiology) | 90 |
| Total | 1065 |

*Field Training*—First year Dental Auxiliary students have a two-week orientation and field training period with the Provincial Department of Health and designated health



units in Alberta. This field work will follow the examinations period in May.

*Second Year*

| | *Hours* |
|---|---|
| ED FDN 301 (Educational Foundations) | 84 |
| D HYG 302 (Pathology) | 54 |
| D HYG 305 (Pharmacology) | 28 |
| D HYG 311 (Office Administration) | 14 |
| D HYG 312 (Clinical Dental Hygiene) | 219 |
| D HYG 313 (Preventive Dentistry) | 276 |
| D HYG 314 (Oral Physiology)) | 14 |
| D HYG 315 (Dental Roentgenology) | 45 |
| D HYG 321 (Dental Health Education) | 45 |
| D HYG 322 (Dental Public Health) | 30 |
| D HYG 323 (Ethics and Jurisprudence) | 15 |
| D HYG 324 (First Aid and Safety Education) | 24 |
| DENT 425 (Pedodontics) | 14 |
| DENT 429 (Anthropology) | 15 |
| Total | 877 |

## 63.2 / *Dental Hygiene Program*

*First Year*

| | *Hours* |
|---|---|
| PUB S 201 (Public Speaking) | 30 |
| SOC 202 (Introductory Sociology) | 80 |
| D HYG 203 (Dental Anatomy) | 70 |
| D HYG 204 (Psychology) | 42 |
| D HYG 205 (Dental Roentgenology) | 15 |
| ENGL 210 (English) | 80 |
| D HYG 211 (Office Administration) | 30 |
| D HYG 212 (Clinical Dental Hygiene) | 216 |
| D HYG 213 (Anatomy and Physiology) | 116 |
| D HYG 220 (Nutrition) | 30 |
| BIOCH 221 (Biochemistry) | 84 |
| D HYG 222 (Oral Histology and Embryology) | 60 |
| D HYG 223 (Dental Materials) | 60 |
| P ED 228 (Physical Education) | 56 |
| MICRB 304 (Microbiology) | 90 |
| Total | 1065 |

*Second Year*

| | *Hours* |
|---|---|
| ED FDN 301 (Educational Foundations) | 84 |
| D HYG 302 (Pathology) | 54 |
| D HYG 305 (Pharmacology) | 28 |
| D HYG 311 (Office Administration) | 14 |
| D HYG 312 (Clinical Dental Hygiene) | 219 |
| D HYG 313 (Preventive Dentistry) | 276 |
| D HYG 314 (Oral Physiology) | 14 |
| D HYG 315 (Dental Roentgenology) | 45 |
| D HYG 321 (Dental Health Education) | 45 |
| D HYG 322 (Dental Public Health) | 30 |
| D HYG 323 (Ethics and Jurisprudence)) | 15 |
| D HYG 324 (First Aid and Safety Education) | 24 |
| DENT 425 (Pedodontics) | 14 |
| DENT 429 (Anthropology) | 15 |
| Total | 877 |

# 64 / DETAILS OF COURSES

## 64.1 / *General Information*

In the following list of courses open to students in the School of Dental Hygiene, each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

The courses are listed in the order of their *numbers,* without regard to subject.

Following the title of each course is the symbol "♦" standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours, respectively, required by the course in a week. When they appear, the symbol "s" denotes seminar hours, the symbol "c" denotes clinic hours, and the symbol "L" denotes combined lecture-laboratory hours. The expression "3/2" means three hours of instruction every second week. The hours of instruction for a full course are the same in both terms unless otherwise indicated. If the course is a half-course, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 64.2 / *List of Courses*

PUB S 201. *Public Speaking.* ♦2 (Second Term, 2-0). The essentials, procedures, preparation, and presentation in public speaking. Organization of a society and conduct of public meetings. Common parliamentary procedure, debating, chairmanship, panel discussions, etc. The development of confidence before audiences by student preparation and presentation of short talks. Dean C. F. Bentley, Faculty of Agriculture.

SOC 202. *Introductory Sociology.* ♦6 (3-0). An introductory analysis of the nature of society, the interrelationships of its component groups, and the process whereby society persists and changes. Society analysed in terms of its structure, culture, and social ranking scheme. The interrelationships between the various institutions (e.g. family, church, school, government). The processes whereby the individual is socialized into society; the sources of conformist and nonconformist behavior. Department of Sociology, Faculty of Arts.

D HYG 203. *Dental Anatomy.* ♦4 (First Term, 3-3). The structure, function, and morphology of the human teeth and dentition. Introduction to com-

parative dental anatomy. Laboratory: how to recognize, describe, and reproduce the tooth forms. Faculty of Dentistry.

D HYG 204. *Psychology.* ♦4 (First Term, 3-0). An introduction to psychology, its material and fundamental laws, application, and relations to other sciences, with particular reference to the development of personality, emotions, learning, motivation, adjustment, and habit formation. Reference to child psychology and individual differences. Student Counselling Services.

D HYG 205. *Dental Roentgenology.* ♦1 (Second Term, 1-0). Fundamental principles of dental roentgenology. The interpretation of oral anatomy and recognition of abnormalities on x-ray film. The technical aspects of x-rays; the taking, processing and mounting of x-rays. Faculty of Dentistry.

ENGL 210. *English Language and Literature.* ♦6 (3-0). Designed to increase appreciation of good literature and to afford practice in setting down ideas in good English. Department of English, Faculty of Arts.

D HYG 211. *Office Administration.* ♦2 (1-0). General office administration and personnel in a dental office. Procedures of patient contact and management, records, economics, bookkeeping, reception, and chairside assisting. School of Dental Hygiene.

D HYG 212. *Clinical Dental Hygiene.* ♦9 (3-6; 0-7c). A lecture, pre-clinical, and clinical course covering the role of the Dental Hygienist in clinical approach to prevention of caries and periodontal disease, patient education, and chairside instruction in proper oral hygiene. School of Dental Hygiene.

D HYG 213. *Anatomy and Physiology.* ♦6 (2-2). Basic anatomy, physiology, and histology; the normal functions of the human body. Faculty of Dentistry.

D HYG 220. *Nutrition* ♦2 (Second Term, 0-2). The general food requirements for growth, maintenance and repair of the body. Carbohydrates, fats, proteins, vitamins, minerals, and water and their relation to dental health. Individual diet assessment and counselling and the application of nutrition factors in dental health education. Faculty of Dentistry.

BIOCH 221. *Biochemistry.* ♦4 (First Term, 3-0). Elements of general, organic, and biological chemistry; important types of organic compounds; and an introduction to the types of chemical change that occur in life processes. Faculty of Agriculture.

D HYG 222. *Oral Histology and Embryology.* ♦3 (Second Term, 1-3). The histological development and structural characteristics of the head, face, oral cavity, and teeth. General study of the elementary body tissues and structures to supplement the introduction to histology in Dental Hygiene 213. Faculty of Dentistry.

D HYG 223. *Dental Materials.* ♦3 (Second Term, 1-3). The properties, preparation, and manipulation of materials used in dentistry. Laboratory work includes student participation in the taking and pouring up of preliminary impressions, fabrication of trays, the pouring of restorations, investing and casting, as well as the manipulation of waxes, cements, gold, amalgam, perio pack, etc. Faculty of Dentistry.

ED FDN 301. *Introduction Education.* ♦4 (First Term, 3-3). The history of education, various influences that have shaped and changed educational beliefs and philosophy, current trends in education, the administration of education, curriculum planning, and teaching methods. Laboratory: observation and practical teaching experience.

D HYG 302. *Pathology.* ♦3 (First Term, 1-3). Introduction to general pathology with consideration of the more common diseases affecting the human body. Clinical pathology of the diseases affecting the teeth, their supporting structures, and the oral cavity, including consideration of oral manifestations of selected systematic disturbances. Visual differentiation between normal and abnormal tissues, the physiological and pathological changes which affect the gingiva, and the ability to recognize lesions of the hard and soft structures of the oral cavity. Faculty of Dentistry.

MICRO 304. *Microbiology.* ♦4 (Second Term, 3-3). Lectures and demonstrations to show the general principles of the study of micro-organisms with special emphasis on their application to the dental field. The classification and differentiation of micro-organisms, methods of isolation, growth and identification. General principles of asepsis, antisepsis and antibiosis, and immunity. The epidemiology of diseases and the precautionary measures used to prevent the transmission of communicable diseases. Department of Bacteriology, Faculty of Medicine.

D HYG 305. *Pharmacology.* ♦3 (First Term, 2-0). General principles of therapeutics and the pharmacological effects of medication, classified by the responses of organ systems of the body. The beneficial and adverse effects of drugs: the applications of the following drug groups: local and systemic anti-infectives, sedatives, hypnotics, stimulants, anti-convulsants, analgesics, psychotherapeutic agents, anaesthetics, cardiovascular drugs, anti-coagulants, coagulants, blood forming agents and replacements, hormones, enzymes, and nutritional agents. Dental and oral therapeutics and therapeutic aids used in dental hygiene. School of Dental Hygiene.

D HYG 311. *Office Administration.* ♦2 (1-0; 0-3). Continuation of Dental Hygiene 211. Instrument and equipment selection. Clinical application of nutrition and diet counselling. Practical experience in assisting by working with dental students in a clinical environment. School of Dental Hygiene.

D HYG 312. *Clinical Dental Hygiene.* ♦9 (0-10c) Continuation of Dental Hygiene 212, devoted to clinical experience. As opportunity presents, clinical experience will be gained in working with handicapped persons and with school children under the Indian Health Services Alberta Branch, and in the Dental Clinic at the University of Alberta Hospital. School of Dental Hygiene.

D HYG 313. *Preventive Dentistry.* ♦6 (2-3; 2-6). Lecture, laboratory, and clinical observation periods in the various areas of dentistry. The preventive aspects in restorative dentistry, periodontics, pedodontics, orthodontics, oral diagnosis, and oral surgery. The course will include Dentistry 425 (see below). Faculty of Dentistry.

D HYG 314. *Oral Physiology.* ♦1 (First Term, 1-0). The physiological functions of the oral structures. Physiological aspects of the periodontal tissue with special emphasis on its innervation, nutrition, and reaction to injuries. Lectures on dynamics of mastication, kinesiology of the masticatory muscles, temporomandibular joint, deglutition, speech, special reflexes involving cranial nerves, receptors of the stomotognathic system, salivary glands, composition of the saliva and its relevance to caries. Oral manifestation of metabolic disease, physiology of pain, infection, and oral habits that affect the physiological functions of the oral cavity. Faculty of Dentistry.

D HYG 315. *Dental Roentgenology.* ♦6 (0-2c). Continuation of Dental Hygiene 215. Clinical experience in the taking, processing and mounting of x-rays. The long cone technique and the bisecting angle technique and extra-oral techniques. Faculty of Dentistry.

D HYG 321. *Dental Health Education.* ♦4 (Second Term, 3-0). Techniques and methods of communication used in dental health education. Methods and available materials for dental health education, the preparation and presentation of dental health education for various age or interest groups in the school and community. The use of audio-visual materials and the operation of audio-visual equipment. Critical reviews of various types of dental health education material available to the public. Prepare literature review papers on assigned topics of Dental Research. School of Dental Hygiene.

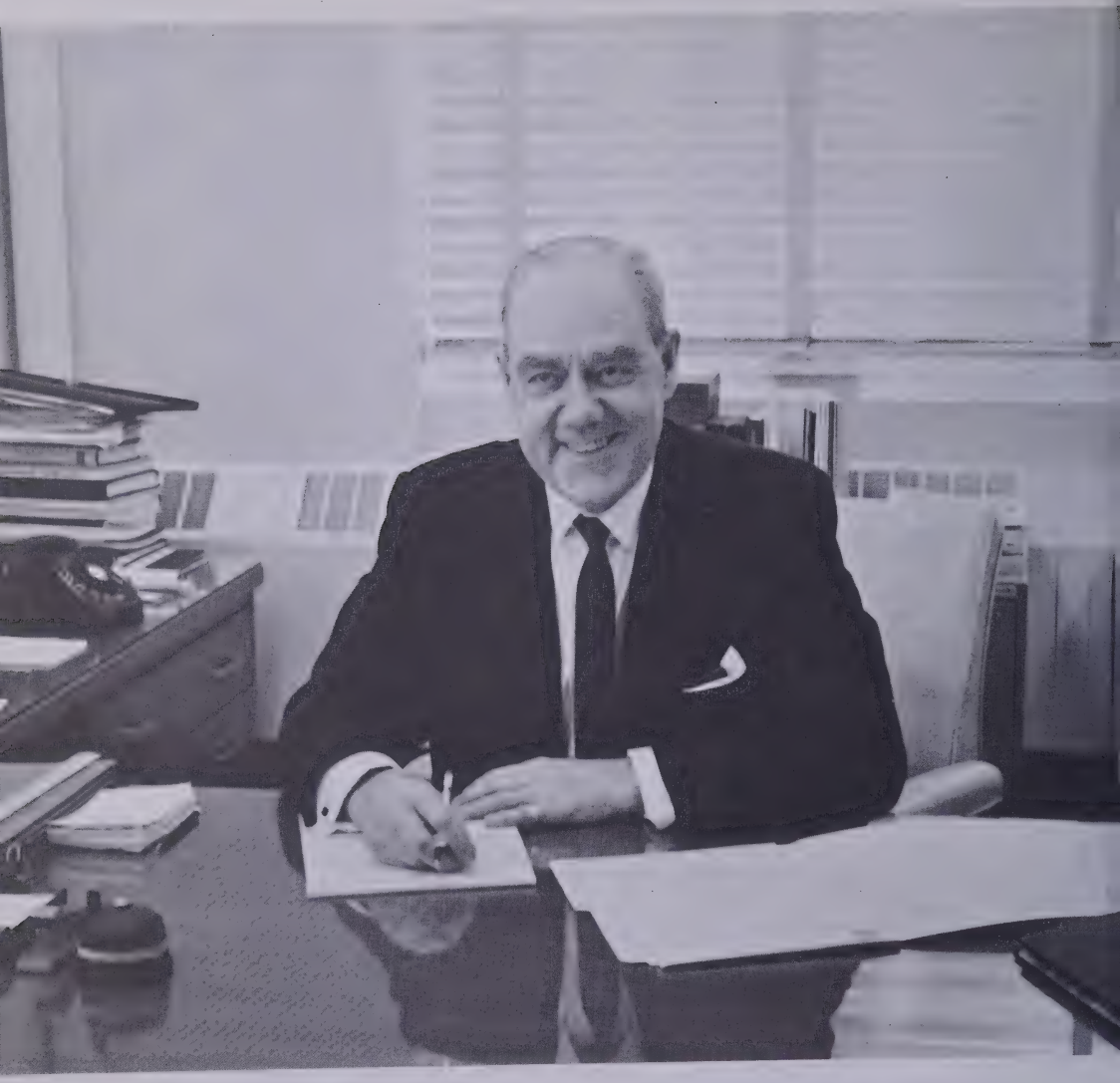
D HYG 322. *Dental Public Health.* ♦3 (Second Term, 2-0). The historical and philosophical background of public health; the history of dentistry; the function of dentistry in public health services. The role of the dental health team as related to the concept of community dental health. Note: Dental Auxiliary students are required to complete a two-week field training period in Public Health at the conclusion of the first year examinations. Dental Hygiene students are encouraged to take the field of training session if locations permit. Faculty of Dentistry.

D HYG 323. *Ethics and Jurisprudence.* ♦C( Second Term, 1-0). Designed to give the Dental Auxiliary and Dental Hygienist a thorough understanding of their profession and its relationship with the profession and practice of dentistry. School of Dental Hygiene.

D HYG 324. *First Aid and Safety Education.* ♦1 (Second Term, 1-1). Instruction and practice in the basic principles of first aid as established by St. John Ambulance Association. Safety education about the home, school and community with particular reference to the prevention of accidents that are injurious to the teeth and face. School of Dental Hygiene.

DENT 425. *Pedodontics.* Mental and physical growth and development of the pre-school child. Faculty of Dentistry.

DENT 429. *Anthropology.* ♦C (Second Term, 1-0). Anatomy, a brief survey of ancient man and of the anatomical evidence for man's place in nature.



*Dr. H. R. MacLean, Dean of the Faculty of Dentistry.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# *Faculty of Dentistry*

## 66 / INTRODUCTORY

### 66.1 / *Members of the Faculty*

#### 66.1.1 / FACULTY OF DENTISTRY

*Professors Emeritus*
H. E. BULYEA
W. S. HAMILTON
S. D. FRASER

*Professor and Dean*
H. R. MacLEAN

*Professors*
R. V. BLACKMORE
A. D. FEE
G. H. GIBB
R. D. HARYETT
K. A. McMURCHY
J. TUBA

*Associate Professors*
D. M. COLLINSON
H. M. DICK
S. G. GELDART
W. T. HARLEY
D. G. MacGREGOR
P. D. MacRAE
W. C. MEYER
R. P. MULLEN
R. C. McCLELLAND
A. J. SIMONS
W. J. SIMPSON
G. H. SPERBER
E. A. STANG
D. R. STEWART
N. R. THOMAS
R. S. VAN ALSTINE

*Assistant Professors*
B. J. EASTWOOD
H. S. FLEMING
D. J. GAU
M. D. JONES
D. H. MacDOUGALL
Z. M. PAWLIUK
H. L. SAMUELS
R. C. SILLS
D. L. STEWART
M. G. STRELIOFF

*Lecturers*
J. M. CALVERT
R. B. CAMERON
(Mrs.) K. M. DAVIDSON
G. A. DEANE
R. E. DONNELLY
R. C. HAGER
J. HARDY
T. E. JONES
C. J. PERVERSOFF
F. L. PETERSON
F. D. READ
S. W. P. SAPKOS
W. R. STUART
J. A. THEODORE
A. C. THOMPSON

*Sessional Lecturers*
A. BORKENT
D. M. BUCHANAN
W. A. BUCK
K. A. BURNHAM
R. L. COSTIGAN
G. E. DECKER
C. G. DUKE
M. M. FEDORETZ
J. G. GLOVER
P. G. GOTAAS
C. L. GULLEKSON
H. F. HOLUB
S. M. HOSIZAKI
B. G. KINDRACHUK
S. S. KUCEY
B. L. KUZYK
A. H. LANE
J. G. LARSON
E. W. P. LUXFORD
R. S. MARGOLIS
J. E. L. MATHIESON
D. C. McKECHNIE
C. W. OLSEN
A. D. SPARROW
R. L. TEGART
G. P. WYSOCKI
J. E. M. YOUNG

*Honorary Members*
J. W. CLAY
C. D. HUSBAND
H. B. NESS
W. A. QUIGLEY

#### 66.1.2 / SCHOOL OF DENTAL HYGIENE

*Director and Associate Professor*
(Mrs.) M. BERRY MacLEAN

*Lecturer and Clinical Supervisor*
(Miss) V. A. LOGIE

*Lecturer*
(Mrs.) D. J. THOMAS

*Sessional Lecturers*
(Mrs.) M. BELL
(Mrs.) B. E. BROWN
(Miss) M. GALAC

*Sessional Instructors*
(Mrs.) M. J. HAW
(Miss) A. F. McINTOSH

#### 66.1.3 / ADDITIONAL MEMBERS OF THE FACULTY COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Dean of the Faculty of Medicine*
W. C. MacKENZIE, M.D., C.M., LL.D.

*Professors*
G. B. FRANK, Ph.D. (Pharmacology)
T. S. LEESON, M.D. (Anatomy)
J. W. MACGREGOR, M.D., (Pathology)
M. SCHACHTER, M.D., C.M. (Physiology)

*Assistant Professor*
J. D. M. ALTON, M.D. (Plastic Surgery)

*Representative*
G. E. DECKER, D.D.S.
(Alberta Dental Association)

*Registrar of the University*
A. D. CAIRNS, B.A.

## 66.2 / *General Information*

Dental education was instituted at the University of Alberta in 1917 in the School of Dentistry under the Faculty of Medicine. The first full degree program was offered in 1923, and the first class graduated in 1927. The School became the Faculty of Dentistry in 1944. Dental Auxiliary training was instituted in 1961. In 1962 the School of Dental Hygiene came into being and now offers both the Dental Auxiliary and Dental Hygiene programs. A program of graduate studies was formally approved in 1962.

The aims and purposes of the Faculty are:

(1) to attract and select suitable and well qualified young men and women for dentistry;

(2) to provide the professional leadership, tuition, facilities and atmosphere which will encourage, stimulate and allow each student to develop his full potential in any chosen aspect of his future professional career, whether it be in private practice, a speciality, teaching or research;

(3) to graduate competent and well-trained dentists prepared for a role of leadership and service in their profession and in their community; and

(4) to provide the opportunity and stimulus for continued learning through short post-graduate, graduate and research programs.

*Curriculum.* The Faculty of Dentistry offers a four-year program of study leading to the degree of Doctor of Dental Surgery (D.D.S.), following satisfactory completion of at least *two* pre-professional years of university education. The pre-professional years provide the necessary background in inorganic chemistry, organic chemistry, zoology, physics, the humanities and social sciences.

In the dental curriculum, lecture and laboratory instruction in such fundamental subjects as Anatomy, Physiology, Bacteriology, Histology, Psychiatry, General Pathology, and Pharmacology, and in Medicine, Surgery and General Anaesthesia are offered by the respective departments of other Faculties. The lectures, laboratories, seminars, and clinics offered by the Faculty of Dentistry relate and integrate these fundamental disciplines with the knowledge, skills, judgment and performance required of the dental practitioner.

In addition to bedside and operating instruction in medicine and surgery, the senior students are assigned to the Dental Department and the Department of General Anaesthesia at the University Hospital, which is located three blocks away. It has its dental staff, and dentistry is represented on the hospital advisory board. Thus the student is afforded an opportunity to relate his field of health service to the science and art of preventing, curing, or alleviating disease in general.

Students in all years are assigned to faculty consultants, who will act as their special counsellors during their University programs. These counsellors are appointed by the Dean of the Faculty.

Information on programs of graduate study and continuing education offered by the Faculty will be found in § § 68.2 and 68.3, below.

*Library.* The Medical Sciences reading room of the Cameron Library contains a comprehensive selection of reference materials and textbooks on dentistry and related subjects. In addition, it contains more than 138 current dental journals in English and other languages, and the *Index to Dental Periodical Literature,* an index to all dental periodicals since 1839.

## 66.3 / *Registration and Licensing*

The Faculty of Dentistry of The University of Alberta is approved by the Council on Dental Education of the Canadian Dental Association and the American Dental Association.

Graduates in dentistry from The University of Alberta may register in the Province of Alberta upon payment of a licensing fee without further examination. (Those wishing to practise in any other province should secure from the dental registrar of that province all information respecting the practice of dentistry.) They are also eligible to write the examinations of the National Dental Examining Board of Canada, provided they have taken all their education in schools recognized by the Council on Dental Education, Canadian Dental Association. They are also eligible to write licensing examinations in some of

the states in the United States and the National Board Dental Examinations of the American Dental Association.

The Doctor of Dental Surgery (D.D.S.) degree and the Doctor of Dental Medicine (D.M.D.) degree (granted by some Canadian and United States universities) are equivalent degrees.

## 66.4 / *Finance*

An estimated budget for dental students is as follows:

| | *First Year* | *Second Year* |
|---|---|---|
| Tuition and fees | $ 600 | $ 600 |
| Books and supplies | 170 | 200 |
| Instruments and dental supplies | 295 | 651 |
| Replacement, miscellaneous dental supplies | 125 | 150 |
| Student laundry and cleaning | 20 | 20 |
| Living expenses | 1,340 | 1,420 |
| Total | $2,550 | $3,041 |

| | *Third Year* | *Fourth Year* |
|---|---|---|
| Tuition and fees | $ 600 | $ 600 |
| Books and supplies | 200 | 85 |
| Instruments and dental supplies | 465 | 267 |
| Replacement, miscellaneous dental supplies | 175 | 175 |
| Student laundry and cleaning | 30 | 30 |
| National Dental Examining Boards | — | 125 |
| American Boards examinations | 25 | 25 |
| Living expenses | 1,470 | 1,380 |
| Total | $2,965 | $2,687 |

Financial assistance in the form of loans or grants is available to dental students as outlined in the Awards section of this Calendar.

## 66.5 / *The School of Dental Hygiene*

The School of Dental Hygiene in the Faculty of Dentistry provides two-year academic programs of theoretical and professional training leading to a Dental Hygiene Diploma or Dental Auxiliary Certificate. These programs are approved by the Councils on Dental Education of the Canadian Dental Association and the American Dental Association. Graduates are eligible to practise in any province of Canada, subject to fulfilling the requirements of the respective provincial licensing bodies.

Detailed information on the Dental Hygiene program or the Dental Auxiliary program may be obtained from the School of Dental Hygiene section of the Calendar, §§ 61 to 64, or by writing to the Director, School of Dental Hygiene, Faculty of Dentistry, The University of Alberta.

# 67 / FACULTY REGULATIONS

## 67.1 / *Admission*

(1) *Admission requirement.* The basic requirement for admission to the Faculty of Dentistry is the satisfactory completion (after senior matriculation) of at least two years of university work approved by the Faculty of Dentistry, including full university courses in organic chemistry, inorganic chemistry, physics and zoology (or biology). The requirement can be met in various patterns in different faculties. Students are urged to take the program that they find most interesting, and that will still give them these prerequisites. For information, the Registrar should be consulted.

(2) *Aptitude testing.* Prospective applicants from the *two-year* pre-professional program are advised to take the Canadian Dental Association Aptitude Testing Program as "with these tests it is possible to predict, with a high degree of accuracy, the probable success of students in dental schools." Details should be obtained by writing to the Dean, Faculty of Dentistry, The University of Alberta, Edmonton.

(3) *Application deadline.* All students wishing to enter the first professional year of dentistry are required to make application on or before May 15. Residents outside Canada must make application on or before April 15. A student proceeding towards a first degree will normally be required to attend at least one academic year as a full-time student. In general, consideration for admission to the limit of available accommodation will be given to those students with a grade-point average of at least 5.5 in all courses taken after senior matriculation.

(4) *Limitation on enrolment.* Enrolment in any faculty or school must necessarily be limited to the number of students who can be accommodated. Students are normally accepted in the order of their academic

standing from among the whole list of applicants.

(5) *Interview.* While admission to dentistry is based largely on academic standards, it must be distinctly understood that no student can be guaranteed admission to dentistry on the basis of academic standing alone. Before final acceptance any applicant may be required to satisfy representatives of the Faculty at a personal interview. The possession of personal qualities necessary for successful practice will be stressed.

(6) *Deposit.* Each applicant, when notified that his application has been accepted, shall within a period of fifteen days of the date of notification *pay a deposit of $50.00* to The University of Alberta, Edmonton, which amount will later (i) be applied on his fees if he registers, or (ii) be refunded in full if the applicant is unable to register and notifies the Registrar of this fact not later than July 15 of the year of application, or (iii) be forfeited in full if the applicant fails to register or neglects to notify the Registrar of his change of intention on or before July 15.

## 67.2 / *Academic Standing*

(1) Dentistry is on a one-year system; except in special circumstances students must complete each year before being promoted.

(2) Students in the Faculty of Dentistry are required to obtain a grade of at least 4 in each course and a grade-point average of at least 5.0.

(3) Students will be permitted to repeat first-year Dentistry only in exceptional cases as determined by the Council of the Faculty of Dentistry.

(4) A student permitted to repeat a failed year, who does not achieve a grade-point average of 5.5 to the end of the first term of the repeated year, will be required to withdraw from the Faculty and will be denied further registration in the Faculty.

(5) The requirement for promotion for repeating students in Dentistry is a grade-point average of at least 5.5.

(6) All students entering the junior and senior years of Dentistry are required by Provincial legislation to be registered in the Educational Register of the Alberta Dental Association. This registration permits the practice of dentistry within the confines of the formal dental curriculum.

(7) Commencing in 1969 the second, third, and fourth years of the program may be continuous, thereby reducing the summer vacation between these years to a four-week period. Students registering in the first year 1967, or subsequently, will be advised of the development of this program.

# 68 / PROGRAMS OF STUDY

## 68.1 / *The Degree of D.D.S.*

| | *First Term Hours* | *Second Term Hours* |
|---|---|---|
| *First Year* | | |
| ANAT 412 (General and Neuroanatomy) | 3-4 | 3-4 |
| ANAT 417 (Microscopic Anatomy) | 2-4 | — |
| BIOCH 412 (General Biochemistry) | 3-3 | 3-3 |
| DENT 411 (Orientation History and Ethics) | 1-0 | — |
| DENT 413 (Oral Anatomy) | 2-6 | 1-3 |
| DENT 414 (Community Dental Health) | — | 1-0 |
| DENT 417 (Oral Embryology and Histology) | — | 2-4 |
| DENT 419 (Dental Materials) | 1-0 | 1-0 |
| PHYSL 451 (General Physiology) | 3-0 | 3-3 |
| *Second Year* | | |
| BACT 422 (General Bacteriology) | 3-3 | 1-3 |
| DENT 420 (Full Denture Prosthesis) | 2-6 | 1-3 |
| DENT 421 (Removable Partial Denture Prosthesis) | — | 1-3 |
| DENT 422 (Fixed Partial Prosthesis) | — | 1-3 |
| DENT 423 (Restorative Dentistry) | 1-6 | 1-3 |
| DENT 424 (Oral Pathology) | — | 1-2 |
| DENT 425 (Pedodontics) | 1-0 | — |
| DENT 426 (Oral Diagnosis) | 1-0 | 1-0 |
| DENT 427 (Periodontics) | — | 1-0 |
| DENT 428 (Local Anaesthesia) | 1-0 | — |
| DENT 429 (Anthropology) | — | 1-0 |
| DENT 430 (Orthodontics) | — | 1-0 |
| DENT 431 (Nutrition and Clinical Biochemistry) | — | 1-0 |
| DENT 432 (Oral Physiology) | — | 1-0 |
| PATH 422 (General Pathology) | 4-2 | — |
| PHARM 470 (Pharmacology) | 2-3 | 2-3 |
| PSYCH 420 (Psychodynamics) | — | 1-0 |

| | First Term Hours | Second Term Hours |
|---|---|---|
| *Third Year* | | |
| DENT 440 (Full Denture Prosthesis) | 1-6c | 1-6c |
| DENT 441 (Preventive and Community Dentistry) | — | 1-0 |
| DENT 442 (Fixed Partial Prosthesis) | 1-6 | 0-3c |
| DENT 443 (Restorative Dentistry) | 1-6c | 1-8c |
| DENT 444 (Endodontics) | 1-2 | 0-1c |
| DENT 445 (Pedodontics) | 1-2 | 1-3c |
| DENT 446 (Oral Diagnosis) | 1-0 | 1-0 |
| DENT 447 (Periodontics) | 1-3c | 1-3c |
| DENT 448 (Oral Surgery) | 1-0 | 1-0 |
| DENT 450 (Orthodontics) | 1-2 | 1-2 |
| MED 434 (Medicine) | 0-0 | 1-0 |
| SURG 434 (Surgery) | 0-0 | 1-0 |
| *Fourth Year* | | |
| DENT 460 (Full Denture Prosthesis) | 1-6c | 1-6c |
| DENT 462 (Fixed Partial Prosthesis) | 1-4c | 0-5c |
| DENT 463 (Restorative Dentistry) | 1s-7c | 1s-8c |
| DENT 464 (Endodontics) | 0-1c | 0-1c |
| DENT 465 (Pedodontics) | 1s-3c | 1s-3c |
| DENT 466 (Diagnosis) | 1s-3c | 1s-3c |
| DENT 467 (Periodontics) | 2-3c | 2-3c |
| DENT 468 (Oral Surgery) | 1-3c | 1-3c |
| DENT 470 (Orthodontics) | 1s-3c | 1s-3c |
| DENT 471 (Ethics and Jurisprudence) | 0-0 | 1-0 |
| DENT 472 (Practice Management) | 1-0 | 0-0 |

*Clinical Dentistry.* Students of the two final years are required to carry to completion a specified amount of treatment of patients in the various branches of Dentistry.

Third-year students are assigned to the diagnostic clinic for specified periods in rotation.

Final-year students are assigned to the diagnostic clinic on full time for periods of a week in rotation. The schedule will appear on the Faculty bulletin board. They also receive instruction at the University Hospital in general anaesthesia, medicine, surgery, and restorative dentistry.

## 68.2 / *Graduate Study*

The Faculty of Dentistry has research laboratories and instructional facilities for a limited number of graduate students proceeding to the M.Sc. degree.

Dental graduates may undertake graduate programs in either basic science or clinical science. Students without dental qualifications, but who hold a B.Sc. degree in biological or physical science, are eligible for graduate work in the division of basic research in Dentistry. Additional information regarding graduate programs may be found in the Faculty of Graduate Studies section of the Calendar.

Inquiries should be directed to the Chairman, Committee on Graduate Studies, Faculty of Dentistry, The University of Alberta, Edmonton.

## 68.3 / *Continuing Education*

Courses are offered by various departments from time to time to provide a program of continuing education for the dental profession. A program outlining dates, course descriptions, participation, and length is prepared annually and distributed to the profession.

# 69 / DETAILS OF COURSES

## 69.1 / *General Information*

Courses open to students in the Faculty of Dentistry are listed here in alphabetical order, whether they are offered by the Faculty of Dentistry or by another faculty or school, except the graduate courses, which are listed separately in § 69.21.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Following the title of the course is the symbol "•", standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours, respectively, required by the course in a week. When they appear, the sybmol "S" denotes seminar hours, the symbol "C" denotes clinic hours, and the symbol "L" denotes combined lecture-laboratory hours. The hours of instruction for a full course are the same in both terms unless otherwise indicated. If the course is a half-course, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 69.2 / *Anatomy*

ANAT 412. *General Anatomy and Neuroanatomy.* ♦9 (3-4). Gross anatomy of the body in general and of the head and neck in detail; the structure of the nervous system. Textbooks: *Manual of Dissection;* Lockhart, Hamilton, Fyfe, *Anatomy of the Human Body.*

ANAT 417. *Microscopic Anatomy.* ♦4 (First Term, 2-4). The minute anatomy and development of the tissues and organs of the human body with special attention to the teeth and related oral structures. Textbook: Leeson and Leeson, or Bloom, *Histology.*

DENT 417. *Oral Embryology and Histology.* ♦4 (Second Term, 2-4). A lecture and microscopic laboratory course dealing with the embryology of the face and oral cavity, the development and minute anatomy of the teeth and their supporting structures, the salivary glands, and the upper digestive tract.

DENT 429. *Anatomy (Anthropology).* Credit (Second Term, 1-0). A brief survey of ancient man, and of the anatomical evidence for man's place in nature. Prerequisite: Anatomy 411 or 412.

## 69.3 / *Bacteriology*

BACT 422. *Bacteriology.* ♦6 (2-3, 1-3). First Term: general bacteriology, illustrating the fundamental aspects of infection and resistance. Second Term: the special bacteriology of the mouth in relation to dental caries and periodontal disease. Laboratory: exercises in bacteriological technique. Textbook: Burnett and Scherp, *Oral Microbiology and Infectious Disease.*

## 69.4 / *Biochemistry*

BIOCH 412. *General Biochemistry.* ♦9 (3-3). Designed to give students in first-year Dentistry an appreciation of general biochemical concepts in relation to metabolism. In addition, consideration is given to metabolism in certain disease books. Prerequisites: Chemistry 230 and Chemistry 250. Textbooks: Clark, *Experimental Biochemistry;* White, Handler and Smith, *Principles of Biochemistry,* third edition.

DENT 431. *Nutrition and Clinical Biochemistry.* ♦1 (Second Term, 1-0). Basics of nutrition and diets and their practical applications in Dentistry. Also selected topics, e.g., calcium and inorganic phosphate metabolism, including mineralization mechanisms and disturbances; enzymes in the gastrointestinal tract, blood, and tissues, in relation to the health of the whole body and of oral tissues. Prerequisite: Biochemistry 412.

## 69.5 / *Community Dental Health*

DENT 411. *Orientation, History and Ethics.* ♦1 (First Term, 1-0). Introduction to the profession of dentistry in relation to curriculum content, undergraduate requirements, history of the profession, and the development of ethical concepts and their application.

DENT 414. *Dental Public Health and Community Dentistry.* ♦1 (Second Term, 1-0). The concept of community dental health with major emphasis on the role of dentistry in public services. The historical and philosophical background of public health and the development, growth, and current status of principles, legislation, and practices related to dental public health. Textbook: Young and Striffler, *The Dentist, His Practice and His Community.*

DENT 441. *Preventive and Community Dentistry.* ♦1 (Second Term, 1-0). The concepts of community dental health with major emphasis on the role of dentistry in private practice and in the community. A comprehensive approach to the dental health problem, including biometrics as applied in dentistry, prevention and control of dental diseases, auxiliary personnel, and recent legislation.

## 69.6 / *Dental Prosthesis*

DENT 419. *Dental Materials.* ♦2 (1-0). Lectures on the various materials used in dental practice, to familiarize the student with the properties of all accepted materials. Textbooks: Skinner, *Science of Dental Materials;* Dorland, *Medical Dictionary.*

DENT 420. *Full Denture Prosthesis.* ♦8 (2-6, 2-3). Lectures, demonstrations, and laboratory procedures in the construction of artificial full dentures. The lectures relate the material learned in Anatomy 412, Anatomy 416, and Physiology 451 to the principles of full denture construction. Textbook: *Swenson's Complete Dentures,* fifth edition.

DENT 421. *Removable Partial Denture Prosthesis.* ♦3 (Second Term, 1-3). Lecture and laboratory instruction in the classification and design of the various types of removable partial dentures. Emphasis is placed upon the relationship of this type of treatment to operative and periodontal services in restoring the dention to maximum health and function. Textbook: Applegate, *Removable Partial Dentures.*

DENT 440. *Full Denture Prosthesis.* ♦8 (1-6c). A continuation of Dentistry 420 with an introduction to clinical practice.

DENT 460. *Denture Prosthesis.* ♦8 (1-6c). A continuation of Dentistry 440 and Dentistry 421 conforming to the advanced work of the final year, with application to clinical practice.

## 69.7 / *Endodontics*

DENT 444. *Endodontics.* ♦3 (1-2, 0-1c). Lectures and laboratory and clinical work on the conservation of pulp-involved and pulpless teeth. Procedures for diagnosis and treatment, described, demonstrated, and correlated with the related dental and basic sciences. Laboratory practice on manikins under simulated clinical conditions. Second Term: an introduction to clinical procedures with treatment carried out on selected patients. Textbook: Sommer, Ostrander and Crowley, *Clinical Endodontics,* third edition.

DENT 464. *Endodontics.* ♦1 (0-1c; 0-1c). A continuation of Dentistry 444 with application to clinical practice. Endodontic treatment carried out on selected patients. Textbook: Sommer, Ostrander, and Crowley, *Clinical Endodontics,* third edition.

## 69.8 / *Ethics and Jurisprudence*

DENT 471. *Ethics and Jurisprudence.* ♦1 (Second Term, 1-0). The moral and legal aspects of the practice of dentistry. The legal factors are presented and discussed by members of the Faculty of Law.

## 69.9 / *Medicine*

MED 434. *Medicine.* ♦1 (Second Term, 1-0). General aspects of medicine with particular reference to local and systematic diseases of dental interest. For students in third-year Dentistry. Textbook: Comroe, Collins, and Crane, *Internal Medicine and Dental Practice.*

## 69.10 / *Oral Diagnosis*

DENT 426. *Oral Diagnosis and Treatment Planning.* ♦2 (1-0). Diagnostic procedures and their application. The review of normal oral tissues, growth, age changes. The fundamental and elementary principles of dental roentgenology. Textbooks: Wuerhmann and Manson-Hing, *Dental Radiology;* Kerr, Ash, Millard, *Oral Diagnosis,* second edition. Reference: Ennis and Berry, *Dental Roentgenology.*

DENT 446. *Oral Diagnosis and Pathology.* ♦2 (1-0). Special problems in diagnosis, pathology and treatment planning of less common oral lesions and abnormalities. Textbooks: Burket, *Oral Medicine, Diagnosis and Treatment;* Stafne, *Oral Roentgenographic Diagnosis.* Reference: Worth, *Principles and Practice of Radiologic Interpretation.*

DENT 466. *Pathology · Diagnosis Seminar.* ♦5 (1s-3c). Case presentations by the diagnostic and pathology staff. Each student is required to spend not less than one week in the Diagnostic Clinic.

## 69.11 / *Oral Surgery*

DENT 428. *Local Anaesthesia.* ♦1 (First Term, 1-0). Lectures and demonstrations on the administration of local anaesthetics. Textbook: Monheim, *Pain Control in Dental Practice.*

DENT 448. *Oral Surgery.* ♦2 (1-0). Lectures on the diagnosis and treatment of the various conditions of the mouth requiring surgical care, including removal of teeth. Textbook: Archer, *Oral Surgery.*

DENT 468. *Oral Surgery.* ♦5 (1-3c). Clinical instruction and demonstrations of exodontia and minor oral surgical procedures under both local and general anaesthesia. Students assist in and observe oral surgery procedures performed in the University Hospital (and other city hospitals when possible).

## 69.12 / *Pathology*

PATH 422. *General Pathology.* ♦5 (First Term, 4-2). Lectures in general pathology extending over a period of twenty-two weeks. Laboratory instruction in pathologic histology.

DENT 424. *Oral Pathology.* ♦3 (Second Term, 1-2). The pathological study of teeth, their surrounding structures, the mucous membrane, bone, and other tissues. Textbook: Shafer, Hine, Levy, *Oral Pathology,* 1958 edition.

## 69.13 / *Pediatric Dentistry*

### 69.13.1 / ORTHODONTIC DIVISION

DENT 430. *Orthodontics.* ♦1 (Second Term, 1-0). Lectures on the growth and development of the dento-facial complex, and embryology of the face and jaws. Textbook: Moyers, *Handbook of Orthodontics.*

DENT 450. *Orthodontics.* ♦4 (1-2). Lectures designed to acquaint the dental student with the etiology, classification, diagnosis, prevention, and interception of malocclusions. Laboratory instruction in impression, model, and soldering techniques and the construction of appliances designed for cases requiring simple treatment. Textbook: As for Dentistry 430.

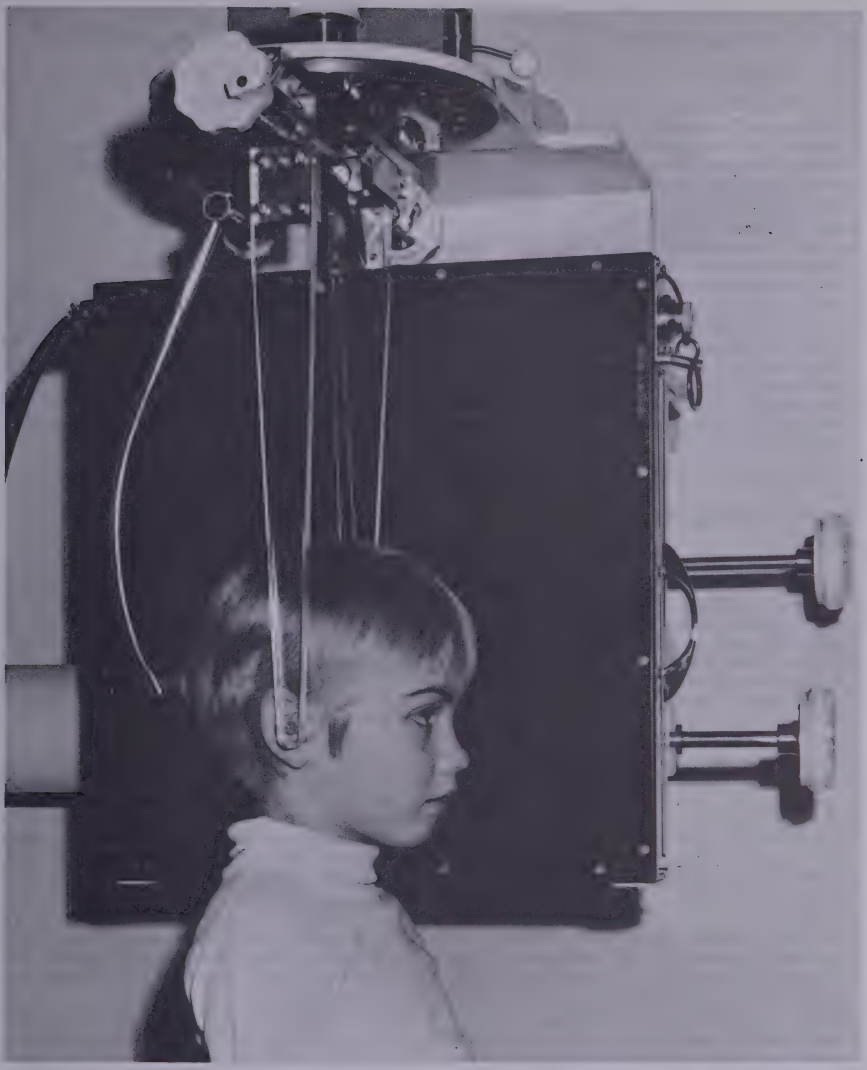
DENT 470. *Orthodontics.* ♦5 (1s-3c). Seminars, clinical demonstrations, and clinical training. Each student presents two seminars. In one, he reads an essay on an assigned clinical topic; in the other, he presents an example of an actual clinical problem which is discussed under the headings of diagnosis, etiology, treatment, and prognosis. Clinical demonstrations are given on selected clinical problems such as band placement, occlusal adjustment in the primary dentition, etc. Clinical training, involving preventive, interceptive, and simple treatment of orthodontic problems of particular concern to the general practitioner, is designed to enable the student to apply knowledge acquired in the lectures and laboratory.

### 69.13.2 / PEDODONTIC DIVISION

DENT 425. *Pedodontics.* ♦1 (First Term, 1-0). Mental and physical growth and development of the pre-school child. Textbook: Gesell, *First Five Years of Life.* References: Valentine, *The Normal Child*; Hall, *A Primer of Freudian Psychology.*

DENT 445. *Pedodontics.* ♦5 (1-2, 1-3c). Physical growth and development in the six to sixteen year age group. Restorative and preventive procedures in pre-school and school-age children. Textbook: Finn, *Clinical Pedodontics.* References: Cohen, *Pediatric Dentistry;* McDonald, *Pedodontics.*

DENT 465. *Pedodontics.* ♦5 (1s-3c). Case analysis and treatment planning; pedodontics in a general practice; dental care for handicapped children, including restorative treatment under general anaesthesia in a hospital. Textbook: Finn, *Clinical Pedodontics.* References: Cohen, *Pediatric Dentistry;* McDonald, *Pedodontics.*



*One of the measuring devices used in Pediatric Dentistry to study a child's growth.*

## 69.14 / *Periodontology*

DENT 427. *Introduction to Periodontics.* ♦1 (Second Term, 1-0). Elementary principles of periodontal disease, and the relationships between basic sciences and the field of periodontology. Emphasis on correlating the basic science courses with the clinical courses which the student will take in third and fourth years.

DENT 447. *Intermediate Periodontics.* ♦5 (1-3c). Clinical application of periodontology, including basic instrumentation procedures and case management of periodontal diseases.

DENT 467. *Advanced Periodontics.* ♦7 (2-3c). Designed to give familiarity with all of the techniques now in general use in periodontal therapy. Correlation between clinical periodontics and histopathology of the periodontium. The student will have the opportunity to treat cases on an individual basis.

## 69.15 / *Pharmacology*

PMCOL 470. *Pharmacology (Second Year).* ♦7 (2-3). The pharmacological action of drugs selected for their physiological and clinical significance. Basic pharmacological principles as applied to representative drugs having their primary actions on various organ systems of the body. Classes of drugs studied include general and local anaesthetics; hypnotics, sedatives and anticonvulsants; analgesics; central nervous system stimulants; autonomic and curariform drugs; histamine and antihistaminics; chemotherapeutic agents.

## 69.16 / *Physiology*

PHYSL 451. *Physiology (First Year).* ♦8 (3-0; 3-3). (i) Basic physiology of cells and tissues of the circulatory, digestive and respiratory systems, and of the phenomena of digestion, absorption, metabolism, and excretion. (ii) The physiology of nerves and synapses, muscle, spinal reflexes, brain centres and tracts, the autonomic nervous system, endocrinology, and reproduction. Note: The lecture course is the same as Physiology 411; the laboratory classes are given separately. Textbooks: Bell, Davidson, and Scarborough, *Textbook of Physiology and Biochemistry;* Bard, *Medical Physiology;* Samson, Wright, *Applied Physiology.*

DENT 432. *Oral Physiology.* ♦1 (Second Term, 1-0). A detailed explanation of the physiological functions of the oral structures. The dynamics of mastication, kinesiology of the masticatory muscle, temporamandibular joint, occlusion, deglutition, etc. Physiology of the cranial nerves with special emphasis on the trigeminal and facial nerves as well as salivary glands and composition of the saliva.

## 69.17 / *Practice Management*

DENT 472. *Practice Management.* ♦1 (First Term, 1-0). Office procedures and administration; the effective integration of auxiliary services. Textbook: Stinaff, *Dental Practice Administration.*

## 69.18 / *Psychiatry*

PSYCI 420. *Psychodynamics in Dentistry.* ♦Credit (16 hours). Essentials of personality dynamics as relevant to the practice of dentistry. The mechanisms of sensation and perception, the significance and effects of anxiety, personality types and their extremes, and methods applicable to the dentist for dealing with patients psychotherapeutically.

## 69.19 / *Restorative Dentistry*

DENT 413. *Oral Anatomy and Introduction to Restorative Dentistry.* ♦8 (2-6, 1-3). The nomenclature, morphology, and chronology of the development of the teeth; the internal and external anatomy of the teeth and their occlusion, with clinical application. Preparation of cavities in stone, and natural teeth and dentoform, preparatory to Dentistry 423. Textbook: Wheeler, *Dental Anatomy and Physiology.*

DENT 423. *Operative Dentistry.* ♦7 (1-6; 1-3). The principles and procedures necessary to successful clinical practice. Technical procedures include preparing cavities in artificial and natural teeth and placing restorations of gold foil, gold inlays, and amalgam in the prepared cavity. Manikins are used, rubber dams placed, and orderly procedure is mandatory. Where timetabling does not interfere the more advanced students will spend some time in the clinic. The student is responsible for supplying suitable natural teeth. Textbook: Black, *Operative Dentistry,* vol. II, ninth edition.

DENT 443. *Operative Dentistry.* ♦9 (1-6c; 1-8c). The application of basic principles to clinical practice. Operative technics related to dystrophies, abrasions, and erosion. Lectures supplemented by a weekly demonstration period. Clinically the student is introduced to operating in the infirmary. Work is done on patients in gold foil, gold inlay, and amalgam. Cleanliness, deportment, and orderliness of procedure are emphasized. Textbook: McGehee, True, Inskipp, *Operative Dentistry.*

DENT 463. *Operative Dentistry.* ♦10 (1s-7c; 1s-8c). Weekly demonstrations supplemented by student clinics, calling for the preparation of papers, slides, and models, in phases of the subject not covered in the regular course. Clinical work is a continuation of Dentistry 443, including an introduction to the use of porcelain, silicates, and cements.

DENT 422. *Fixed Partial Denture.* ♦3 (Second Term, 1-3). Lectures, demonstrations, and laboratory instruction on the basic principles in the construction of and in the preparation of abutment teeth for the reception of retainers, piers, pontics, and connectors for a fixed partial denture. Manikins are used on which a simple bridge is constructed.

DENT 442. *Fixed Partial Denture.* ♦6 (1-6; 0-3c). A continuation of Dentistry 422. First Term: Handling of the various materials used and engineering principles involved in fixed partial denture construction. Instruction in the fabrication of a porcelain jacket crown. Second Term: clinical application of these principles.

DENT 462. *Fixed Partial Denture.* ♦6 (1-4c; 0-5c). A continuation of Dentistry 442.

## 69.20 / *Surgery*

SURG 434. *Surgery.* ♦1 (Second Term, 1-0). Lectures on the general principles of surgery for students in the third year in Dentistry.

## 69.21 / *Graduate Courses*

DENT 500. *Cephalometrics.* ♦5 (1-3).

DENT 501. *Advanced Pedodontics.* ♦8 (1-6).

DENT 502. *Advanced Oral Pathology.* ♦2 (Second Term, 1-2). Techniques for obtaining and preserving specimens for pathological examination, the interpretatioin of pathological reports, and the pathology of some of the rarer oral lesions.

DENT 503. *Mineralization in Biological Systems.* ♦3 (First Term, 3-0). The developmental morphology and the chemical nature of the protein and mineral phases of calcified tissues in man and animals. Emphasis on calcification and decalcification of teeth and bones.

*Dr. Herbert T. Coutts (seated), Dean of the Faculty of Education, with Dr. W. D. Neal, Associate Dean, Planning and Development, and Prof. W. Pilkington, Associate Dean, Student Programs and Records.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# *Faculty of Education*

## 71 / INTRODUCTORY

### 71.1 / *Members of the Faculty*

#### 71.1.1 / OFFICERS OF THE FACULTY

*Dean*
H. T. COUTTS, Ph.D.

*Associate Dean (Planning and Development)*
W. D. NEAL, Ed.D.

*Associate Dean (Student Programs and Records)*
W. PILKINGTON, M.A.

#### 71.1.2 / DEPARTMENT OF EDUCATIONAL ADMINISTRATION

*Professor and Head*
G. L. MOWAT, Ed.D.

*Professors*
H. T. COUTTS, Ph.D.
F. ENNS, Ph.D.
E. D. HODGSON, Ph.D.
W. D. KNILL, Ed.D. (on leave 1968-69)
E. MIKLOS, M.Ed., Ph.D. (on leave 1968-69)
W. D. NEAL, Ed.D.
H. T. SPARBY, Ed.D.

*Associate Professors*
J. J. BERGEN, Ph.D.
C. S. BUMBARGER, Ed.D.
D. FRIESEN, Ph.D.
L. R. GUE, Ph.D.
D. A. MacKAY, Ph.D.
E. W. RATSOY, Ph.D.

*Assistant Professor*
J. M. SMALL, M.Ed.

#### 71.1.3 / DEPARTMENT OF EDUCATIONAL FOUNDATIONS

*Professor and Head*
B. E. WALKER, Ph.D.

*Professors*
B. Y. CARD, Ph.D.
K. H. THOMSON, Ed.D.

*Associate Professors*
N. C. BHATTACHARYYA, Ph.D.
H. GARFINKLE, Ph.D.
A. KAUFMAN, Ed.D.
M. R. LUPUL, Ph.D.
R. S. PATTERSON, Ph.D.
D. R. P. PUGH, M.Ed.

*Assistant Professors*
H. W. HODYSH, Ph.D.
(Miss) H. L. PIERCE, M.Ed.

#### 71.1.4 / DEPARTMENT OF EDUCATIONAL PSYCHOLOGY

*Professor and Head*
B. R. CORMAN, Ph.D.

*Professors*
C. C. ANDERSON, Ed.D.
J. W. GILLES, Ed.D.
S. HUNKA, Ph.D.
R. S. MacARTHUR, Ph.D.
W. H. O. SCHMIDT, Ph.D.

*Associate Professors*
J. E. BICKNELL, Ph.D.
J. K. BISHOP, Ph.D.
F. J. BOERSMA, Ph.D.
D. R. CAMERON, M.Ed.
(Mrs.) J. CHAMBERS, Ph.D.
D. C. FAIR, Ph.D.
M. GULUTSAN, Ph.D. (on leave 1968-69)
V. R. NYBERG, Ed.D.
E. G. STICKEL, Ph.D.
H. W. ZINGLE, Ph.D.

*Assistant Professors*
(Mrs.) R. BARTELL, M.A. (on leave 1968-69)
A. D. J. CÔTÉ, M.Ed.
F. N. DYER, M.A.
(Mrs.) J. L. DYER, M.A.
E. L. EBERLEIN, Ph.D.
R. K. GUPTA, Ph.D.
P. W. KOZIEY, Ph.D.
G. R. LEFRANCOIS, Ph.D.
T. O. MAGUIRE, Ph.D.
(Miss) L. WHYTE, M.Ed.

#### 71.1.5 / DEPARTMENT OF ELEMENTARY EDUCATION

*Professor and Head*
A. KRATZMANN, Ph.D. (to August 31, 1968)

*Professors*
(Mrs.) M. D. JENKINSON, Ph.D.
L. D. NELSON, Ph.D.
W. H. WORTH, Ed.D.

*Associate Professors*
(Mrs.) M. A. AFFLECK, Ph.D.
R. D. ARMSTRONG, Ed.D.
T. P. ATKINSON, B.Sc., B.Ed.
A. BERGER, Ed.D.
(Mrs.) B. R. CUTLER, Ph.D.
(Miss) H. M. DIEMERT, M.A.
(Miss) E. H. FILIPKOWSKI, M.A.
(Miss) P. A. LANE, Ph.D.
N. M. PURVIS, M.Ed.
W. F. REESE, Ed.D.
(Miss) J. E. ROBERTSON, Ph.D.
B. SCHWARTZ, Ed.D.
R. E. STEPHENS, Ed.M.
L. D. STEWART, Ed.D.

R. L. WARE, M.Ed.
L. G. WIEDRICK, B.A., B.L.S., B.Ed.
E. C. WILSON (Sister Mary Liguori), Ph.D.

*Assistant Professors*
J. B. LOMBARD, M.A.
J. T. McBURNEY, M.Ed.
K. A. NEUFELD, Ph.D.
D. SAWADA, M.Ed.

### 71.1.6 / DEPARTMENT OF SECONDARY EDUCATION

*Professor and Head*
G. L. BERRY, Ed.D.

*Professors*
E. W. BUXTON, Ph.D.
C. G. HAMPSON, Ph.D.
W. PILKINGTON, M.A.

*Associate Professors*
T. AOKI, M.Ed.
J. B. BELL, M.Ed. (on leave 1968-69)
M. A. CLARK, Ph.D.
W. R. DRALLE, Ed.D.
(Miss) G. M. FARMER, Ph.D.
D. F. KELLUM, Ed.D.
(Mrs.) M. J. MONOD, M.A., L. ès S.S.
M. A. NAY, Ph.D.
D. V. PARKER, M.A.
S. E. SIGURDSON, Ph.D. (on leave 1968-69)
A. A. SMITH, M. Mus.
D. W. R. WILSON, Ph.D.

*Assistant Professors*
K. L. BOWERS, Ph.D.
D. B. HARRISON, Ph.D.
T. E. KIEREN, M.A.
R. N. MacGREGOR, M.Ed.
M. E. RISKE, M.Sc.

### 71.1.7 / DEPARTMENT OF INDUSTRIAL AND VOCATIONAL EDUCATION

*Professor and Head*
H. R. ZIEL (on leave 1968-69)

*Associate Professors*
J. E. GALLAGHER, M.Ed.
A. MEYERS, Ph.D.
W. W. PEARSON, Ph.D.
C. H. PREITZ, M.A.
H. D. TICHENOR, Ed.D.

*Assistant Professors*
A. K. CLARK, M.Ed.
D. R. LeBLANC, M.Ed.
D. W. MANUEL, M.Ed.
M. W. PETRUK, M.Ed.
L. J. SHIELDS, B.Ed.

### 71.1.8 / SUPPORTING SERVICES

*Co-ordinator, Audio-Visual Media Centre*
W. R. DRALLE, Ed.D.

*Co-ordinator, Field Experience Division*
L. D. STEWART, Ed.D.

*Acting Co-ordinator, Curriculum Laboratory*
L. G. WIEDRICK, B.A., B.L.S., B.Ed.

*Co-ordinator, Research Services Division*
S. HUNKA, Ph.D.

*Co-ordinator, Child Study Laboratory*
H. W. ZINGLE, Ph.D.

### 71.1.9 / ADDITIONAL MEMBERS OF FACULTY COUNCIL

*President of the University*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Representative*
S. C. T. CLARKE, Ed.D., Alberta Teachers' Association

*Other Members*
H. S. BAKER, Ph.D., Dean, Faculty of Education, University of Calgary
(Mrs.) L. SAGER, B.L.S., Education Librarian

*Registrar of the University*
A. D. CAIRNS, B.A.

## 71.2 / *General Information*

The Faculty of Education provides professional education for teachers of the elementary, junior high, and senior high school grades, and for graduate study and research in the field of education. The Faculty offers two general programs, one for elementary school teaching and one for secondary school teaching. Both provide for considerable specialization either in the usual academic subjects or in certain special subjects. In addition there are highly specialized programs for teachers of industrial arts and vocational courses.

All programs for the Bachelor of Education degree also provide for certification to practise as a teacher in Alberta. Certificates are granted by the Minister of Education, on the recommendation of the Faculty of Education.

Inquiries should be addressed to the Associate Dean (Student Programs and Records), Faculty of Education, The University of Alberta.

## 71.3 / *Board of Teacher Education and Certification*

A Board of Teacher Education and Certification representing jointly the Department of Education, The University of Alberta, the Alberta Teachers' Association and the Alberta School Trustees' Association serves as a liaison body for the groups it represents. This board is purely an advisory body. It is authorized to make recommendations to the Minister of Education and to the President of the University respecting the programs of instruction, the estimates of expenditures on these programs, appointments to the staff of the Faculty of Education, and regulations governing the certification of teachers.

## 71.4 / *Education Undergraduate Society*

The Education Undergraduate Society is a professional organization and a branch of the Alberta Teachers' Association (A.T.A.). It is expected that all Education students will join the Society, participate in its social activities, and promote its professional interests.

# 72 / FACULTY REGULATIONS

## 72.1 / *Admission*

### 72.1.1 / MATRICULATION REQUIREMENTS

The matriculation requirements for all B.Ed. programs are set out in § 13.7 of the University Regulations.

### 72.1.2 / ADMISSION WITH ADVANCED STANDING OR ADVANCED CREDITS

Applicants presenting transcripts from normal schools, teachers' colleges, or universities other than The University of Alberta, will have such transcripts evaluated by the Committee on Admissions. The transcripts should be submitted to the Registrar, The University of Alberta, Edmonton. A visé fee of $5.00 is charged for evaluating documents issued in other provinces of Canada and $10.00 for evaluating documents issued in other countries.

### 72.1.3 / ADMISSION WITH EXTRAMURAL CREDITS

(1) Credit to a maximum of four *junior* courses taken extramurally from another recognized university will be allowed, although the actual number will vary with the program.

(2) Established students who expect to receive credit on their University of Alberta program in the Faculty of Education for subjects studied extramurally from other institutions must get permission in writing from the Associate Dean (Student Programs and Records) to take a particular subject for credit.

### 72.1.4 / ADMISSION WITH JUNIOR ELEMENTARY CERTIFICATE

(1) Before a person who holds the Interim Junior Elementary Certificate may proceed to a Bachelor of Education program he must provide evidence to the Dean of the Faculty of Education that he has met matriculation standing.

(2) Persons with deficiencies in the Junior Elementary program will be permitted to clear these deficiencies by completing satisfactorily appropriate subjects approved by the Dean of the Faculty of Education.

### 72.1.5 / APPLICATION FOR ADMISSION

Application procedure is explained in § 14.2 of the University Regulations section of the Calendar.

No definite and final ruling concerning admission can be given until all certificates and transcripts of standing have been reviewed by the Committee on Admissions. The Faculty of Education gladly consults with and advises students regarding programs of study, but all decisions are *unofficial* and *tentative* until documents have been received and evaluated by the Committee on Admissions.

### 72.1.6 / RE-ADMISSION

Students seeking admission to the B.Ed. program for holders of approved degrees on the basis of degrees from The University of Alberta should request and complete Re-Enrolment Forms and submit them to the Student Records Office, Faculty of Education before August 1.

*Students from Thailand in the Industrial and Vocational Education laboratories*

## 72.2 / *Registration*

(1) *Registration Procedure.* The normal procedure for registration is that set out in § 15 of the Calendar.

(2) *Registration in Student Teaching.* Normally a student will register for student teaching in the second year of the B.Ed. program (third year in 1969-70). Students with problems related to health, speech or other disability may be required to delay registration in student teaching. The above applies to Curriculum and Instruction 200, 250, 400 and 450; Industrial Arts 251, 253, 451 and 453.

(3) *Change of Registration.* A student wishing to change his registration must apply to the Student Records Office of the Faculty of Education. The deadline for making changes in the 1968-69 session is September 25.

(4) *Re-Enrolment.* A student seeking re-admission after a break in his program should request Re-Enrolment Forms from the Student Records Office of the Faculty and return them by August 1 if he contemplates attending the Winter Session. A student transferring from one program to another within the Faculty, or from one faculty to another within the University, should consult with the Student Records Office of the Faculty of Education as to the necessity for completing Re-Enrolment Forms.

## 72.3 / *Academic Standings and Graduation*

(1) The pass mark in all courses in both degree and certification programs is grade of 4.

(2) To be granted the B.Ed. degree a student must obtain a grade-point average of at least 5.0 in all courses credited towards the last three years of his degree program.

(3) To be recommended for the first certificate a student must obtain a grade-point average of at least 4.5.

(4) A student transferring to the B.Ed. program at The University of Alberta with Advanced Standing must obtain a grade-point average of at least 5.0 in all courses completed at The University of Alberta for credit towards his degree.

(5) A student may not obtain credit for more than two full courses or equivalent with a grade of 3 during the four-year program.

(6) A holder of an approved degree taking a two-year B.Ed. program may not obtain credit for more than one full course or equivalent with a grade of 3 during the two-year program.

(7) A student will not be allowed to write more than two supplemental examinations in any one year.

(8) A student will not be allowed to write more than five supplemental examinations in the four-year program.

(9) A holder of an approved degree taking a two-year B.Ed. program will not be allowed to write more than two supplemental examinations in the two-year program.

(10) A teacher who, during the regular Supplemental Examination period, is in a teaching position may, with the approval of the Dean, write the supplemental examination at the end of the Summer Session. If an examination in the required subject is on the regular schedule, the fee for the supplemental is $10.00. If a special examination paper must be prepared, the fee is $40.00.

(11) A student who fails a course in the Summer Session will not be granted a supplemental privilege.

(12) There is no supplemental privilege in student teaching.

(13) A student who, in any Winter Session, is unable to complete Student Teaching because of Faculty regulations based on School Board policies will be required to withdraw from Student Teaching and re-register for the Student Teaching course in a subsequent year. This regulation applies in Curriculum and Instruction 200, 250, 400, and 450.

(14) A student will not be granted the privilege of repeating a failed course more than once during his degree program.

(15) A student will not be granted the privilege of repeating a failed year more than once during his degree program.

(16) A student who is repeating a year will be granted no supplemental privileges in the courses taken that year and must pass all courses with a grade-point average of at least 4.6 to be allowed to continue.

(17) The maximum number of additional courses, including repeated courses, in which a student may enrol during a B.Ed. program may not exceed by more than five the number of courses required for completion of any B.Ed. program.

(18) Special regulations applying to particular routes to the B.Ed. degree are set out in § 73, below.

## 72.4 / *Special Regulations*

(1) *Transfer from one Program to Another.* In general, a student may transfer from one training program to another at any point in the four-year program, provided he obtains credit in subjects of the program which were not included in the former one.

(2) *Advance Credits for Certificated Teachers.* One year's credit in the four-year program is given for one year of basic teacher education.

(3) *Special Second-Year Program for Certificated Teachers.* Certificated teachers will for their second year be entered upon a special program consisting almost exclusively of Arts and Science courses. (See below, § 73.4).

(4) *Review of Inactive Programs.* A student whose B.Ed. program has been inactive for three years or who has failed to complete the degree in fifteen years may have his program reviewed and, if necessary, rearranged.

(5) *Department of Education Summer Session.* Allowance for credit from Department of Education Summer Sessions was withdrawn effective September 1, 1965.

## 72.5 / *Certification*

### 72.5.1 / GENERAL INFORMATION

Alberta teaching certificates are issued only by the Department of Education of the Province of Alberta. For details of the regulations governing certification of teachers, students should write to the Registrar, Department of Education, Administration Building, Edmonton. A pamphlet is available on request.

# 73 / PROGRAMS OF STUDY

## 73.1 / *The Degree of B.Ed.— General Information*

The course requirements of the following programs are described in the sections indicated:

B.Ed. Program, Elementary Route—§ 73.2
B.Ed. Program, Secondary Route—§ 73.3
Special Transfer Program for Certificated Teachers: Elementary and Secondary—§ 73.4
B.Ed. Program in Industrial Arts—§ 73.5
Special Transfer Program for Certificated Teachers: Industrial Arts—§ 73.6
B.Ed. Program in Vocational Education, Route I—§ 73.7
B.Ed. Program in Vocational Education, Route II—§ 73.8
B.Ed. Programs for Holders of Approved Degrees—§ 73.9
Advanced Study in Education—§ 73.10

A student coming directly from high school should note that the first year of the program is common to both the Elementary and Secondary routes. This common year provides flexibility and gives the student a year in which to consider his teaching preference.

Each student must complete a major in a field of teaching concentration or specialization. In the Elementary route program the major consists of four courses; in the Secondary route program the major consists of seven courses. These are taken over the four years of the program. Particular care should be exercised with regard to prerequisite courses.

Educational Foundations 496 is an alternative to Educational Foundations 492, and a student may not obtain credit for both.

## 73.2 / *Standard Elementary Route*

### 73.2.1 / PROGRAM OF COURSES

*First Year*

(1) Educational Foundations 201 and Educational Administration 261
(2) Educational Psychology 269 and 271
(3) English 200 or 210
(4) A course in the student's major field
(5) An approved Arts or Science option
(6) Physical Education 218 (men) or 228 (women)

*Second Year*

(For students who began program before September 1, 1968)

(1) Curriculum and Instruction 205 and 231
(2) Curriculum and Instruction 209 and 213
(3) Curriculum and Instruction 221 and 237
(4) Physical Education 237 and Curriculum and Instruction 227
(5) Curriculum and Instruction 200
(6) A course in the student's major field

NOTE A: Elementary route students in the second year do not continue classes in subjects listed under 1, 2, 3, 4, during student teaching.

NOTE B: For special Transfer Second Year, Elementary route, see below, section 73.4.

*Third Year*
(For students who began program before September 1, 1968)

(1) Educational Psychology 471 and one other approved half-course in Educational Psychology
(2) Philosophy 240 or 242
(3) A course in the student's major field
(4) An approved Social Science or History option
(5) An approved Arts or Science or Education option

*Fourth Year*
(For students who began program before September 1, 1968)

(1) Educational Foundations 492 or 496
(2) A course in the student's major field
(3) An Arts or Science option
(4) A senior Education option
(5) A senior Arts or Science or Education option (see § 73.2.5, ¶(1) )

## 73.2.2 / SPECIAL REGULATIONS

(1) In the third and fourth years the program may not contain more than two full year or four half-year Senior Education options in addition to the required curriculum and instruction course on the major and the required courses in Educational Foundations and Educational Psychology. Transfer students will have one additional Senior Education option in the second year.

(2) For information concerning certification see § 72.5.

## 73.2.3 / MAJOR FIELDS

Each student must select a major field of study. Courses in that field are to be chosen in accordance with the following patterns.

(1) *Art*—
  (i) Art 231
  (ii) Art 335 and one approved half course in Art at the 300 level
  (iii) Curriculum and Instruction 309 and one approved senior level half course in Art at the 300 level
  (iv) Curriculum and Instruction 410
(2) *Early Childhood Education*—
  (i), (ii), and (iii) *Three* full course equivalents to be chosen from the following courses and half courses:
  Art 231
  Drama 240 or 320
  English 398
  Music 210, 213, 305, 307
  Physical Education 202, 433
  (iv) Curriculum and Instruction 426
(3) *English*—
  (i) English language or linguistics course. (An Arts or Science option may be taken in the first year in lieu of a course in the major)
  (ii) Children's Literature
  (iii) Any senior English or linguistics course
  (iv) *Two* of: Curriculum and Instruction 417, 419 *or* 421, 437, 439
(4) *French*—
  (i) French 201
  (ii) French 330
  (iii) Approved Senior French
  (iv) Curriculum and Instruction 331 *and* 333 *or* 335
(5) *Mathematics*—
  (i) Mathematics 274
  (ii) Mathematics 374
  (iii) Mathematics 242
  (iv) Curriculum and Instruction 427 and 429
(6) *Music*—
  (i) Music 213
  (ii) Music 202
  (iii) Two approved half courses in music or Music 250 or 302
  (iv) Curriculum and Instruction 414
(7) *Physical Education*—
  (i) Physical Education 202
  (ii) Physical Education 325 and 327
  (iii) Physical Education 422
  (iv) Physical Education 419 and 429

NOTE: Physical Education majors are advised to enrol in Physical Education 325 and 327 in the same year they take student teaching.

(8) *Science*—
  (i), (ii), and (iii) *Three* science courses at least two of which are laboratory courses from at least two different fields
  (iv) Curriculum and Instruction 431 and 433
(9) *Social Studies*—
  (i) A junior (200-level) course in social science or history
  (ii) and (iii) *Two* senior courses in the field chosen as a major. The courses of the major must be in a field other than that selected as a social science or history option in the third year
  (iv) Curriculum and Instruction 405 and 407
(10) *Special Education (Exceptional Children)*—
  (i) Educational Psychology 354
  (ii), (iii) and (iv) *Six* half courses in Special Education selected from Educational Psychology 351, 353, 355, 357, 359, 451, 453, 455, 457, 459

NOTE: Students electing a major in Special Education will plan their programs jointly in consultation with the Department of Elementary Education and the Department of Educational Psychology, and devote half of Curriculum and Instruction 200 (Student Teaching) to a practicum in regular classrooms and half to a practicum in special classrooms.

## 73.2.4 / USE OF OPTIONS

Students should give careful consideration to the various opportunities provided by the Arts or Science option, the Education option, and the Senior Arts or Science or Education option in the Elementary Route program. These may be regarded as "free" options and used to explore a variety of fields; or some of them may be patterned in such a way as to provide modest preparation for certain special functions related to teaching in the elementary school.

The following examples illustrate the way in which these courses may be patterned to reflect a student's special interest.

(1) *Elementary school libraries.* Curriculum and Instruction 345 and 347, Curriculum and Instruction 446, English 398 and an approved Arts or Science option.

(2) *Education of exceptional children and youth.* See § 73.3.8 (9).

(3) *Early childhood education.* Curriculum and Instruction 420 and 426 and an approved Arts or Science option.

(4) *Speech education.* Curriculum and Instruction 341 and 343 and two approved related options.

(5) *Reading.* A course in English language or linguistics, English 398, Curriculum and Instruction 417 and *one* of 419 or 421.

(6) *Second-language instruction.* Linguistics 370, Linguistics 389 and Curriculum and Instruction 331 and 333 *or* 337 and 339.

(7) *Language. Two* of Linguistics 305, 389 or English 398 and *two* of Curriculum and Instruction 345, 347, 341, 417 *or* Curriculum and Instruction 437 and 435.

(8) *Further study in the major field.* Two Arts or Science courses in the student's major field and one supporting Education option.

Other patterns are available in reading, modern languages, etc. Students are urged to plan the patterning of their optional courses in consultation with the Associate Dean (Student Programs and Records) or the head of the Department of Elementary Education.

### 73.2.5 / PROGRAM IN INTERCULTURAL EDUCATION

The Department of Elementary Education offers a special program in Intercultural Education, designed to prepare teachers for work in schools in areas where other cultures (e.g., Indian or Eskimo) prevail. This program entails the selection of options in accordance with a prescribed pattern, and the acquisition, in addition to academic training, of relevant practical experience.

(1) *Selection of Courses*

(i) In the third year, the approved social science or history option should be Sociology 202 or 403 or Anthropology 302 or 305. The approved Arts or Science option should be Linguistics 305, 350, or 389.

(ii) In the fourth year, the senior Education option should be Curriculum and Instruction 337 (Introduction to the Teaching of English as a Second Language) and Curriculum and Instruction 339 (Methods and Programs in the Teaching of English as a Second Language). The senior Arts, Science or Education option should be Educational Foundations 416 (Anthropology 416).

(2) *Practicums*

A minimum of two practicums, or equivalent field experience, should be obtained as follows:

(i) *Non-teaching field experience in regular employment.* This field experience should normally be obtained in the summer before entering the third year of the B.Ed. program.

(ii) *Teaching field experience.* This field experience should normally be obtained at the end of the fourth year of the B.Ed. program. It may take the form of either (a) non-contractual teaching in which the student is not obligated to give further service to the school system employing him for the practicum, or (b) contractual teaching, or internship, in which the student is obligated to continue teaching in the school system after graduation from the B.Ed. program.

(iii) A student wishing to complete a third practicum should consult with his program adviser.

Any student interested in the program in Intercultural Education is urged to consult the Associate Dean (Student Programs and Records) or the head of the Department of Elementary Education.

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## 73.3 / *Standard Secondary Route*

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### 73.3.1 / PROGRAM OF COURSES

*First Year*

(1) Educational Foundations 201 and Educational Administration 261
(2) Educational Psychology 269 and 271
(3) English 200 or 210. (English majors must elect English 200.)
(4) A course in the student's major field
(5) An approved Arts or Science option
(6) Physical Education 218 (men) or 228 (women)

*Second Year*

(For students who began program before September 1, 1968)

(1) Curriculum and Instruction in the major field
(2) Curriculum and Instruction 250
(3) An approved Social Science or History option
(4) A course in the student's major field
(5) A course in the student's major field or an Arts or Science option

NOTE A: At least three courses in the major field must be completed by the end of the second year.

NOTE B: For special Transfer Second Year, Secondary Route, see below, § 73.4.

*Third Year*

(For students who began program before September 1, 1968)

(1) Educational Psychology 471 and one other approved half course in Educational Psychology
(2) Philosophy 240 or 242
(3) A course in the student's major field
(4) A senior Education option
(5) A course in the student's major field or an Arts or Science option

*Fourth Year*

(For students who began program before September 1, 1968)

(1) Educational Foundations 492 or 496
(2) A course in the student's major field
(3) A senior Education option
(4) A course in the student's major field or an Arts or Science option
(5) A course in the student's major field or an Arts or Science option

*Computing equipment is used both for research and as an aid to instruction*

## 73.3.2 / SPECIAL REGULATIONS

(1) Students must complete the seven courses required for the major in the four years of the program.

(2) For information concerning certification see § 72.5.

## 73.3.3 / MAJOR FIELDS

Each student must select a major field of study. Courses in that field are to be chosen in accordance with the following patterns.

(1) *Art*—
- (i) Art 231
- (ii) Art 335 plus a senior half course in Art
- (iii) Art 401
- (iv) and (v) The equivalent of *two* senior courses in Art *or* one senior course in Art plus Philosophy 350
- (vi) and (vii) *Two* approved options

(2) *Biological Sciences*—
- (i) Biology 130
- (ii) Biology 230
- (iii) Approved senior Zoology
- (iv) and (v) Chemistry 230 and 350 *or* Chemistry 250 and an approved senior Zoology, Botany, Entomology, or Genetics course
- (vi) An approved senior Botany course
- (vii) An approved senior course in Biology, Biochemistry, Entomology, or Genetics

NOTE: Students who enter this program with credit in Biology 30 (or equivalent) are not required to take Biology 130. Instead, they will move directly to the second course on the major pattern and take an approved Botany course to complete the prescribed core.

(3) *Business Education*—

(a) *Secretarial*
- (i) Business Education 341 and 343
- (ii) Accounting 202 and 204
- (iii) *Two* of: Business Education 351, 353, 355
- (iv) Business 202 or 300
- (v) Business 310 and 312
- (vi) and (vii) *Two* approved options in a related field

(b) *Accounting-Clerical*
- (i) Business Education 341 and 353
- (ii) Accounting 202 and 204
- (iii) Business Education 351 and 355
- (iv) Business 202 or 300
- (v) Business 310 and 312
- (vi) and (vii) *Two* approved options in a related field

NOTE: Students lacking the prerequisites for Business Education 341 or 343 should consult the Department before registration. Normally, students will present items (i) and (ii) of one of the above patterns as prerequisites to Curriculum and Instruction 282 (see § 73.3.2, ¶ (1) ).

(4) *Drama*—
- (i) Drama 252
- (ii) Drama 240
- (iii) Drama 270
- (iv) Drama 420
- (v) Drama 300 or 400
- (vi) and (vii) *Two* senior drama courses *or* approved options

(5) *English*—
- (i) English 288
- (ii), (iii) and (iv) *Three* of English 332, 356, 364, 373, 380, 383, 384, 388, 392, 393, 396, or Linguistics 389
- (v) Any senior English course *or* Linguistics 389 *or* Drama 240
- (vi) and (vii) Any two senior English courses *or* two approved courses in history, foreign language, the fine arts, classics or linguistics

(6) *French*—
- (i) French 201 or 230
- (ii) French 330
- (iii) French 340
- (iv) Linguistics 370 (for which French 330 *and* 340 are prerequisites)
- (v) French 350
- (vi) and (vii) *Two* senior French courses or approved options

(7) *German*—
- (i) German 200
- (ii) German 330
- (iii) German 350
- (iv) and (v) *Two* senior German courses
- (vi) and (vii) *Two* approved options

(8) *Household Economics*—
- (i) Chemistry 250
- (ii) Household Economics 201 and 221
- (iii) Household Economics 203 and 307
- (iv) Household Economics 321 and 325
- (v) Household Economics 303 and 355
- (vi) Household Economics 350
- (vii) An approved Household Economics option *or* an approved option in a related field

NOTE: Students granted advanced placement will substitute another half course for Household Economics 203.

(9) *Junior High School Science*—
- (i) Biology 230
- (ii) Chemistry 230
- (iii) Physics 200
- (iv) Geology 201 (or equivalent)
- (v), (vi) and (vii) *Three* of Astronomy 253 *or* another Biology *or* Chemistry *or* Geology *or* Physics course

(10) *Languages* (not mentioned elsewhere)—
Courses not specified. Students should consult with the head of the Department of Secondary Education or his representative.

(11) *Latin*—
- (i) Latin 200
- (ii) Latin 300
- (iii) Latin 373
- (iv) Latin 374
- (v) Latin 375
- (vi) and (vii) *Two* approved options

(12) *Mathematics*—
- (i) Mathematics 274
- (ii) Mathematics 201 or 207 or 180
- (iii) Mathematics 374
- (iv) Approved senior Mathematics courses
- (v) Statistics 255
- (vi) and (vii) Two senior Mathematics courses *or* two approved courses in a related field

(13) *Music*—
- (i) Music 213
- (ii) Music 304
- (iii) Music 311
- (iv) and (v) Music 202, 250, 302, 402 or 404
- (vi) and (vii) Any *two* of the courses listed under (iv) and (v), or Music 350, or Philosophy 350, or approved options in a related field

(14) *Physical Education*—
- (i) Physical Education 236
- (ii) Physical Education 336
- (iii) Physical Education 436
- (iv) Physical Education 362
- (v) Physical Education 371 and 391

(vi) Physical Education 442
(vii) Physical Education 363 and Physical Education option

(15) *Physical Sciences*—
(i) Chemistry 230
(ii) Mathematics 207 or 201 or 220
(iii) Physics 200 or 240
(iv) Chemistry 350
(v) An approved senior Physics course
(vi) An approved senior Physics or Chemistry course
(vii) An approved course in Chemistry, Physics, Geology, Astronomy, Meteorology *or* Physical Geography

NOTE: Careful attention should be given to the Mathematics prerequisites or corequisites for Physics courses.

(16) *Slavonic Languages*—
(i) Russian 100 or Ukrainian 200
(ii) Russian 300 or Ukrainian 330
(iii) Russian 374 or Ukrainian 420
(iv) Russian 390 or Ukrainian 390
(v) *One* of Russian 360 and 400, *or* Ukrainian 360 and 400
(vi) and (vii) *Two* senior courses in Slavonic Languages or approved options

(17) *Social Studies*—
(i) History 200
(ii) History 370
(iii) Geography 201
(iv) Geography 300
(v) and (vi) *Two* approved Social Science or History courses, one of which must be in a field other than History *or* Geography
(vii) Approved senior Social Science *or* History course

### 73.3.4 / USE OF OPTIONS

Students should give careful consideration to the various opportunities provided by the two Arts or Science options and the two Education options in the Secondary B.Ed. program. These may be regarded as "free" options and used to explore a variety of fields; or they may be patterned in such a way as to provide some preparation for certain functions related to teaching in the Secondary School.

The following examples illustrate the way in which these courses may be patterned:

(1) *Further specialization in educational psychology.* Four of the following half courses: Educational Psychology 411, 421, 473, 475, 487, 489 plus two of Sociology 360, 370, Psychology 353 and 383, or Statistics 255 and two of: Sociology 341, 343 or Psychology 336.

(2) *Further specialization in teaching field.* Two Arts or Science courses in the major field, one advanced Curriculum and Instruction course and one supporting Education option.

(3) *Physical education in the secondary school.* Physical Education 236 and 336, Curriculum and Instruction 498 and a related Education option.

(4) *Teaching in the junior high school.* Two Arts or Science options (selected to give breadth) and two Education options.

(5) *Library services in the secondary school.* Curriculum and Instruction 345 and 347, 446, English 398 or an Arts option and another selected Arts or Science option.

(6) *Speech education.* Curriculum and Instruction 341 and 353.

(7) *Intercultural education.* One of: Sociology 202, Anthropology 302, Sociology 403; Linguistics (Anthropology) 305 (Linguistics 350 or 389 will be accepted in lieu of Linguistics 305); Educational Foundations 416 (Anthropology 416). Recommended, but not required: Curriculum and Instruction 337 and 339.

(8) *Reading in the junior and senior high school.* Curriculum and Instruction 417 and either 451 or 455; a course in linguistics of English language and one of: English 393, Philosophy 250, 440 or 462.

(9) *Special Education (psychology and education of exceptional children).* Within the Elementary and Secondary Routes of the B.Ed. program students may secure varying levels of preparation in the field of special education. On the Elementary Route program there is a major in special education (See § 73.2.3, ¶ (10) ). Educational Psychology 354; two half courses selected from Educational Psychology 351, 353, 355, 357, 359, 451, 453, 455, 457, 459; and one or two related Arts or Science options selected from Anthropology 416, Genetics 352, 465, Psychology 309, 365, 431, 468, 475, 476, 489, 492, Sociology 311, 321, 325, 329, 341, 373, 374.

## 73.4 / *Special Transfer Second Year for Certificated Teachers*

### 73.4.1 / GENERAL INFORMATION

Certificated teachers are granted credit for the first year of the general B.Ed. program for their Normal School or Junior E training, provided that this training was of not less than seven months duration.

If such certificated teachers have clear matriculation into the Faculty of Education, they will be admitted to the second year of the program. A special program for the second year is provided in order that all essential courses will be included.

It will be noted that candidates taking the Elementary route have six courses to do; those entering the Secondary route have seven. The reason for this extra load is that all one-year training was in the field of elementary education.

Students may take only five courses in a Winter Session. A Summer Session is required to complete the *transfer* second year. Students entering the Secondary route should note that they must present credit in at least one course in their major field as prerequisite to the second and third courses in that field and as prerequisite to the Curriculum and Instruction course in the transfer year. Hence, they must normally take the Summer Session prior to the Winter Session of the transfer year.

For information concerning certification see § 72.5.

### 73.4.2 / TRANSFER SECOND YEAR

*Elementary Route*

(1) English 200 or 210
(2) and (3) Two courses in the student's major field
(4) and (5) Two Arts or Science options
(6) A senior Education option

*Secondary Route*

(1) and (2) Two courses in the student's major field
(3) An approved Social Science or History course
(4) English 200 or 210
(5) Curriculum and Instruction (major field)
(6) A course in the student's major field
(7) An Arts or Science option (which may be in the student's major field)

NOTE: Some observation and student teaching may be required of students registered in these courses.

### 73.4.3 / THIRD AND FOURTH YEARS

The remainder of the program is the same as for the regular B.Ed. program, Elementary or Secondary route. (See §§ 73.2.1 and 73.3.1).

## 73.5 / *The Degree of B.Ed. in Industrial Arts*

### 73.5.1 / GENERAL INFORMATION

Industrial Arts, in its modern sense, is general education designed to support, supplement, and reinforce other academic disciplines through laboratory experience, directed discovery and exploratory teaching methods as well as the more usual teaching forms and learning opportunities. A large part of the program is conducted in multiple-activity laboratories where students gain experience using up-to-date equipment and study the educational influences of modern technology. The program includes all of the basic elements of professional teacher education with special attention to methods of teaching, mathematics and the physical and social sciences through laboratory experience.

### 73.5.2 / PROGRAM OF COURSES

*First Year*

(1) Industrial Arts 203 and Education Administration 261
(2) Educational Psychology 269 and 271
(3) English 210
(4) Approved Mathematics course
(5) Industrial Arts 260
(6) Physical Education 218 (men), 228 (women)

*Second Year*
(For students who began before September 1, 1968)

(1) Approved Chemistry course
(2) Industrial Arts 251 and 253
(3) Approved Physics course
(4) Approved Social Science course
(5) Industrial Arts 270

NOTE: For special Transfer Second Year, see below, § 73.6.

*Third Year*
(For students who began before September 1, 1968)

(1) Educational Psychology 471 and one other approved half course in Educational Psychology
(2) Philosophy 240 or 242
(3) Approved Arts or Science option
(4) Industrial Arts 360
(5) Industrial Arts 370

*Fourth Year*
(For students who began before September 1, 1968)

(1) Educational Foundations 492 or 496
(2) Approved Social Science course
(3) Industrial Arts 350
(4) Industrial Arts 460
(5) Industrial Arts 470

### 73.5.3 / SPECIAL REGULATIONS

(1) Transfers may be arranged from former B.Ed. in Industrial Arts programs to the present program.

(2) For information concerning certification see § 72.5.

## 73.6 / *Transfer Second Year in Industrial Arts for Certificated Teachers*

(1) Industrial Arts 203
(2) English 200 or 210
(3) Approved Mathematics course
(4) Industrial Arts 260
(5) Approved Chemistry course
(6) Approved Physics course
(7) Industrial Arts 270

NOTE: Some observation and student teaching may be required of students registered in Industrial Arts courses.

## 73.7 / *The Degree of B.Ed. in Vocational Education, Route I*

### 73.7.1 / FIRST YEAR

Students granted admission to the B.Ed. in Vocational Education, Route I program must meet special admission requirements. This is considered as the equivalent of a major in secondary route programs. Credit is granted for the first year on the following basis:

(1) Trade training as verified by a recognized Certificate of Qualification as a Journeyman for a designated trade or equivalent for a non-designated trade. The trade qualification is to be approved by

an admissions subcommittee consisting of the Dean of the Faculty of Education, the Head of the Department of Industrial and Vocational Education, the University Admissions Secretary, the Chairman of the Provincial Apprenticeship Board, the Director of Vocational Education of the Department of Education.

(2) Experience in a trade or industry calling for the trade training held by the candidate, this also to be verified by the admissions subcommittee.

Any questions concerning this program should be directed to the Associate Dean (Student Programs & Records), Faculty of Education.

### 73.7.2 / SUBSEQUENT YEARS

*Second Year*

(1) Educational Foundations 201 and Educational Administration 261
(2) Vocational Education 204
(3) Educational Psychology 269 and 271
(4) English 210
(5) Vocational Education 279 and 281
(6) Curriculum and Instruction 250

*Third Year*

(1) Educational Psychology 471 and one other approved half course in Educational Psychology
(2) Philosophy 240 or 242
(3) Vocational Education 350
(4) and (5) Two approved junior Arts or Science options

*Fourth Year*

(1) Educational Foundations 492 or 496
(2) Vocational Education option
(3), (4), and (5) Three approved senior Arts or Science options

### 73.7.3 / SPECIAL REGULATIONS

In the third and fourth years of the program one Arts or Science sequence should relate directly to vocational education and one should provide an element of general education.

For information concerning certification see § 72.5.

## 73.8 / *The Degree of B.Ed. in Vocational Education, Route II*

### 73.8.1 / PRE-REGISTRATION REQUIREMENTS

The admission requirements for the program in Vocational Education, Route II, are given in § 13.7.2 above. They include credit for Vocational Education 223, ten weeks' supervised field experience in July, August, and part of September before registration.

### 73.8.2 / PROGRAM OF COURSES

*First Year*

Vocational Education 223—ten weeks of supervised field experience in July, August and part of September prior to registration.
(1) Educational Foundations 201 and Educational Administration 261
(2) Educational Psychology 269 and 271
(3) English 210
(4) Approved Mathematics course
(5) Vocational Education 204
(6) Physical Education 218 (men), 228 (women)

Vocational Education 323—eighteen weeks of supervised field experience from May to September.

*Second Year*

(1) Vocational Education 279 and 281
(2) Curriculum and Instruction 250
(3) An approved Industrial Arts Laboratory
(4) An approved Sociology course
(5) An approved Arts or Science option

Vocational Education 333—seventy weeks of supervised field experience from May of one year to September of the following year.

*Third Year*

(1) Educational Psychology 471 and one other approved half course in Educational Psychology
(2) Philosophy 240 or 242
(3) Vocational Education 350
(4) and (5) Two approved junior Arts or Science options

Vocational Education 423—eighteen weeks of supervised field experience from May to September.

*Fourth Year*

(1) Educational Foundations 492 or 496
(2) An approved Sociology course
(3) A Vocational Education option
(4) and (5) Two approved senior Arts or Science options

### 73.8.3 / SPECIAL REGULATIONS

In the third and fourth years of the program one Arts or Science sequence should relate directly to vocational education and one should provide an element of general education.

For information concerning certification see § 72.5.

## 73.9 / *Special Programs for Holders of Approved Degrees*

### 73.9.1 / GENERAL INFORMATION

The Faculty of Education offers a special program for holders of approved degrees. Students may emphasize preparation as an elementary (Grades I-VI) or secondary (Grades VII-XII) teacher. Those with experience and preparation in recognized areas may seek admission to the program for teachers in vocational schools. A program in Industrial Arts is available and should be planned in consultation with the Head

of the Department of Industrial and Vocational Education.

Normally the holder of an approved degree may qualify for the Bachelor of Education, the B.Ed. in Vocational Education or the B.Ed. in Industrial Arts upon completion of eleven courses. The first six courses of the program constitute one winter session and students who do not hold teaching certification must plan to attend one full winter session for minimum certification. The remaining five courses may be taken in a subsequent winter session or in Summer Session or Evening Credit Programs.

Students in the first year of this program should register as B.Ed./AD 1 and in the second year of the program as B.Ed./AD 2.

## 73.9.2 / B.ED. PROGRAMS AFTER APPROVED DEGREE

### *First Year—Elementary Specialization*

(1) Educational Administration 461
(2) Educational Psychology 471 and one other approved half course in Educational Psychology
(3) Curriculum and Instruction 400
(4) Educational Foundations 492 *or* 496
(5) Curriculum and Instruction 402
(6) Curriculum and Instruction 404

### *First Year—Secondary Specialization*

(1) Educational Administration 461
(2) Educational Psychology 471 and one other approved half course in Educational Psychology
(3) Curriculum and Instruction 450
(4) Curriculum and Instruction (in major field)
(5) Educational Foundations 492 *or* 496
(6) Educational Foundations 413 and 417, *or* Educational Psychology 487 and 489. Students without a basic course in Sociology will take Educational Foundations 403 in lieu of 413

### *First Year—Vocational Education Specialization*

(1) Educational Administration 461
(2) Educational Psychology 471 and one other approved half course in Educational Psychology
(3) Vocational Education 479 and 481
(4) Curriculum and Instructon 450
(5) Educational Foundations 492 or 496
(6) Vocational Education 404

NOTE: Candidates must hold a Journeyman's Certificate or have had preparation and experience recognized by the University as equivalent. (See § 72.1.2.) Usually holders of a B.Sc. in Engineering, B.Comm., B.Sc. in Home Economics or other degree with appropriate specialization and adequate industrial experience are admissible.

### *Second Year*

(7) and (8) Two approved Education courses
(9) and (10) Two approved Arts or Science courses
(11) An approved Education or Arts or Science course

NOTE A: The second year of the Bachelor of Education program for holders of approved degrees is the same in each area of specialization: elementary, secondary, vocational education.

NOTE B: Students may pattern their options to give greater depth in the area of teaching concentration. Provision is made for the planning of the options to provide for further specialization in subject fields, guidance and counselling, library services, early childhood education, reading, education of exceptional children, intercultural education and the like. (See regular B.Ed. programs, elementary and secondary route, for details.)

## 73.9.3 / MODIFIED PROGRAM FOR THOSE LACKING CERTAIN PREREQUISITES

Students must present a basic Psychology course as a prerequisite for Educational Psychology 471 and a basic Philosophy course as a prerequisite for Educational Foundations 492 or 496. Students lacking the necessary prerequisites will plan their program in a slightly different manner.

Students will register in the following basic courses:

(1) *Elementary—*
  (i) Educational Administration 461
  (ii) Curriculum and Instruction 402
  (iii) Curriculum and Instruction 404
  (iv) Curriculum and Instruction 400
(2) *Secondary—*
  (i) Educational Administration 461
  (ii) Curriculum and Instruction (in major field)
  (iii) Curriculum and Instruction 450
  (iv) Educational Foundations 413-417 *or* Educational Psychology 487-489
(3) *Vocational Education—*
  (i) Educational Administration 461
  (ii) Vocational Education 479 and 481
  (iii) Curriculum and Instruction 450
  (iv) Vocational Education 404

The remaining two courses in the first year will be as follows for students in the three areas of specialization:

(a) For those lacking the Educational Foundations 492 or 496 prequisite:
  (v) Educational Psychology 471 and one other half course in Educational Psychology
  (vi) Philosophy 240 or 242
(b) For those lacking the Educational Psychology 471 prerequisite:
  (v) Educational Psychology 269 and 271
  (vi) Educational Foundations 492 or 496
(c) For those lacking the prerequisites to *both* Educational Psychology 471 *and* Educational Foundations 492 or 496:
  (v) Educational Psychology 269 and 271
  (vi) Philosophy 240 or 242

Students will complete the required Educational Foundations 492 or 496 and Educational Psychology 471 and one other half course in Educational Psychology as items (7) or (8). Completion of the remaining three or four courses on the program will meet the requirements of the B.Ed. degree.

## 73.9.4 / SPECIAL REGULATIONS

(1) A student who presents a degree which does not contain the equivalent of a major as required in the regular secondary or elementary route B.Ed. program will be required to make up this deficiency before proceeding with the B.Ed. program. A maximum of two such courses may be counted toward the degree.

(2) Holders of the B.Comm. degree wishing to enter the Business Education program must have credit in Typewriting 10 from high school or its equivalent. A student who is deficient in this respect should take Business Education 246 at the Summer Session prior to registering in the Winter Session.

(3) Holders of an approved Honors or Master's degree may qualify for the B.Ed. degree by completing the first eight of the required courses and meeting the graduation requirements.

(4) A student interested in qualifying for a Master's degree or a Graduate Diploma rather than for a B.Ed., following the Professional Certificate year, should consult the appropriate department regarding the requirements for graduate study.

(5) The student's attention is drawn especially to paragraphs (6), (7), and (9) of the Academic Standings and Graduation regulations in § 72.3, above.

(6) Students on the B.Ed. in Vocational Education must include Vocational Education 350 as one of the Education options in the second year of the program.

(7) For information concerning certification see § 72.5.

### 73.9.5 / TRANSFER PROGRAM FOR CERTIFICATED TEACHERS (JUNIOR E OR EQUIVALENT) HOLDING APPROVED DEGREES

For the Professional Certificate those holding approved degrees and teaching certificates (Junior E or equivalent) should present the following courses:

(1) *Elementary*—
- (i) Educational Psychology 471 and one other half course in Educational Psychology
- (ii) Educational Foundations 492 or 496

(2) *Secondary*—
- (i) Educational Psychology 471 and one other half course in Educational Psychology
- (ii) Educational Foundations 492 or 496
- (iii) Curriculum and Instruction course in the major field

(3) *Vocational Education*—
- (i) Educational Psychology 471 and one other half course in Educational Psychology
- (ii) Educational Foundations 492 or 496
- (iii) Vocational Education 479 and 481
- (iv) Vocational Education 404

To obtain the B.Ed. degree, such candidates will present in addition, items (7) to (11) inclusive of the program as listed in § 73.9.2 above.

## 73.10 / *Advanced Study in Education*

### 73.10.1 / GRADUATE DIPLOMA PROGRAMS

The Faculty of Education sponsors a series of diploma programs providing additional special qualifications in designated areas. Admission to the Graduate Diploma Program will be granted to holders of an approved degree and a Professional Teaching Certificate or its equivalent. Normally, courses taken prior to the 1963 Summer Session may not be credited toward the Diploma unless the student is currently a candidate for the M.Ed. degree and is transferring from it. Students who now hold the M.Ed. degree may not obtain the Diploma on the basis of courses credited on the M.Ed. degree program. Courses credited toward the diploma may not also be credited toward the B.Ed. degree. The pass mark for courses to be credited toward the Diploma is a grade of 6. Residence requirements for the Diploma may be met in consecutive Summer Sessions or in a Winter Session.

Diploma programs are offered by all departments of the Faculty. Inquiries should be directed to the office of the department concerned.

When a diploma program has been approved, the student must apply to the Student Records Office, Faculty of Education for the diploma on the form provided by the department concerned. Diplomas are not issued until formal application has been made.

### 73.10.2 / GRADUATE DEGREE PROGRAMS

In the Faculty of Education graduate work is offered for the preparation of teachers, supervisors, guidance workers, administrators and other educational specialists, and may lead to the degrees of Master of Education, Doctor of Education and Doctor of Philosophy. Candidates for these advanced degrees choose an area of concentration corresponding to the specialization of a particular department as follows:

*Department of Educational Administration*: school administration (elementary and secondary), general supervision, school finance and business administration, chief administrative roles. Head—Dr. G. L. Mowat.

*Department of Educational Foundations*: philosophy, sociology, and history of education. Head—Dr. B. E. Walker.

*Department of Educational Psychology*: child and adolescent psychology, educational

psychology, guidance, mental hygiene, special education, clinical psychology, tests and measurements. Head—Dr. B. R. Corman.

*Department of Elementary Education*: curriculum and instruction in kindergarden, primary and elementary education (Grades I-VI). Head—.....

*Department of Industrial and Vocational Education*: Industrial Arts and Vocational Education. Head—Dr. H. R. Ziel.

*Department of Secondary Education*: curriculum and instruction in secondary education. (Grades VII-XII). Head—Dr. G. L. Berry.

In order to meet the needs and interests of candidates, the departments permit considerable flexibility in the programs leading to advanced degrees. In general, students pattern their courses from the offerings of the department of their choice supplemented by approved courses from other departments of the University. Normally a candidate for the master's degree must present a program consisting of six courses and a minor thesis. A candidate for the master's degree is required to spend at least one academic year in study and research in residence at The University of Alberta. A candidate for the doctor's degree (if he already holds a master's degree) is normally required to spend two academic years in study and research in residence at The University of Alberta.

Graduate courses in education are offered in both the regular and the summer sessions.

A student who wishes to inquire about graduate programs should address his preliminary inquiries to the Dean of the Faculty of Graduate Studies, The University of Alberta, Edmonton.

After a student has decided upon an area of specialization, he should communicate directly with the appropriate department head and, if possible, arrange for an interview. By this means the student's eligibility will be determined and further information given about the degree programs available in the department.

All candidates for graduate degrees register with the Faculty of Graduate Studies which administers graduate programs throughout the University.

### 73.10.3 / SPECIAL STUDENTS

A student holding a B.Ed. degree or the equivalent and not desiring to register for a graduate degree, or not meeting all the requirements for admission to the Faculty of Graduate Studies, may register in the Faculty of Education as a special student.

# 74 / DETAILS OF COURSES

## 74.1 / *General Information*

The courses listed in sections 74.2 to 74.9 inclusive represent the total offerings of the Faculty of Education. Courses on the majors are usually offered by the Faculties of Arts, Science, Physical Education, Business Administration and Commerce. For the convenience of first year students the first course on each major is listed alphabetically in section 74.10.

Each course is designated by its computer abbreviation and by a number which indicates the level at which it is offered. Students should use this abbreviation and number when filling in their registration forms. Courses numbered at the 100 level are introductory, usually equivalent to senior matriculation courses; those numbered at the 200 level are junior, normally taken by first year students; those numbered at the 300 level are senior, taken after the first year; those numbered at the 400 level are advanced normally taken by third- and fourth-year students. Courses numbered at the 500 and 600 level are open only to graduate students. In special cases students on B.Ed. programs may be permitted to register in 500 level courses but special permission to do so must be obtained in writing from the Head of the Department offering the course.

Letter prefixes indicate subject fields as follows: Education — Administration (ED ADM); Education—Adult (ED ADU); Education—Business (ED BUS); Education—Curriculum and Instruction (ED CI); Education—Foundations (ED FDN); Education—Industrial Arts (ED IA); Education—Psychology (ED PSY); Education—Vocational (ED VOC).

The course title is followed by the symbol "•" and a number indicating the course weighting used in computing the grade-point average. Usually a half course carries a weighting of 3, a full course a weighting of 6. The statement in parentheses refers to the number of hours required by the course each week. For half courses the term in which the course is offered is listed first. For full courses the time allotment is the same in both terms. The number of lecture hours is shown first, followed by the number of laboratory hours, e.g., 3-3 indicates three hours of lectures and a three-hour

laboratory each week. In some courses the lectures and laboratories are combined and this is shown as 3L. Sometimes seminar hours are also shown, indicated by an "s" after the figures; e.g. 3-1s-3 indicates three hours of lectures, one hour seminar and a three-hour laboratory.

Not all courses are offered each session and further details concerning courses should be requested from the department responsible for the course.

## 74.2 / *Education—Administration*

ED ADM 261. *Educational Administration: The Role of the Teacher.* ♦3 (either term, 3-0).

ED ADM 461. *Educational Administration: The Role of the Teacher.* ♦3 (2-0). For holders of approved degrees.

ED ADM 463. *The Role of the Administrator and the Supervisor.* ♦3 (either term, 3-0). Prerequisite: ED ADM 261 or 461 or consent of the Department.

NOTE: Full year courses corresponding to ED ADM 461 and 463 are designated 462 and 464 and are normally offered only in the Summer Session.

ED ADM 500. *Research Seminar*—Non-credit: hours to be arranged.

ED ADM 504. *Seminar on the Comprehensive High School.* ♦6 (6-3).

ED ADM 510. *Research Design and Data Analysis.* ♦6 (3-1).

ED ADM 525. *Administration of Educational Personnel.* ♦3 (either term, 3-0).

ED ADM 559. *Administration of Public Education in Canada.* ♦3 (either term, 3-0).

ED ADM 561. *Evolving Concepts in Educational Administration.* ♦3 (either term, 3-0).

ED ADM 563. *Administration of the Educational Program.* ♦3 (either term, 3-0).

ED ADM 565. *Educational Finance.* ♦3 (either term, 3-0).

NOTE: Full-year courses corresponding to the above half-year courses (525, 559, 561, 563, and 565) are designated ED ADM 526, 560, 562, 564-566 and are normally offered only in the Summer Session.

ED ADM 610. *Advanced Research Design and Data Analysis.* ♦6.

ED ADM 626. *Administrative Behavior.* ♦6.

ED ADM 660. *Educational Administration*—The Social and Political Environment. ♦6.

ED ADM 662. *Organizational Theory.* ♦6.

ED ADM 664. *Problems in Educational Administration.* ♦6.

ED ADM 666. *Educational Finance.* ♦6.

ED ADM 670. *The Development and Administration of Higher Education.* ♦6.

## 74.3 / *Education—Adult*

ED ADU 521. *Psychology of Learning and Teaching at the Adult Level.* ♦3 (either term, 3-0). A study of learning and teaching from the background of educational and developmental psychology.

ED ADU 523. *Development and Administration of Adult Education Programs.* ♦3 (either term, 3-0). Adult Education in sociological, cultural and economic perspectives; organization and implementation of programs.

## 74.4 / *Education—Business*

ED BUS 246. *Typewriting and the Teaching of Typewriting.* ♦6 (5L). Note: Open to students not eligible for admission to ED BUS 346. See ED BUS 345.

ED BUS 248. *Shorthand and the Teaching of Shorthand.* ♦6 (5L). Note: Open to students not eligible for admission to ED BUS 343. See ED BUS 347.

ED BUS 341. *Advanced Typewriting and the Teaching of Typewriting.* ♦3 (either term, 3-0). Prerequisite: Typewriting 20 of the high school with B standing, or the Junior Certificate in Typewriting. Note: Students who do not show sufficient competence in typewriting will be required to register in ED BUS 246. Not open to students who hold credit in ED BUS 246.

ED BUS 343. *Advanced Shorthand, and the Teaching of Shorthand.* ♦3 (either term, 5L). Prerequisites: Typewriting 20 and Shorthand 20 of the high school with B standing, or the Junior Certificates in Shorthand and Typewriting. Note: Students who do not show sufficient competence in shorthand will be required to register in ED BUS 248. Not open to students who hold credit in ED BUS 248.

ED BUS 345. *Advanced Typewriting.* ♦3 (either term, 3L). Prerequisite: ED BUS 246. Note: Required of candidates who present ED BUS 246 for credit on the major in business education.

ED BUS 347. *Advanced Shorthand.* ♦3 (either term, 5L). Prerequisites: ED BUS 248 and ED BUS 246 or 346. Note: Required of candidates who present ED BUS 248 for credit on the major in business education.

ED BUS 351. *Office Procedures.* ♦3 (either term, 3L). Office organization and services with special reference to business communication and filing. Prerequisite: competence in typewriting, or corequisite: ED BUS 246.

ED BUS 353. *Business Machines.* ♦3 (either term, 5L). Prerequisite: competence in typewriting, or corequisite: ED BUS 246.

ED BUS 355. *Data Processing.* ♦3 (either term, 5L). Commercial applications, and the teaching of data processing in the secondary school. Prerequisite: competence in typewriting or corequisite: ED BUS 246.

ED BUS 460. *Curriculum and Instruction in Secondary School Distributive Education.* ♦6 (3-0). Prerequisite: consent of the Department.

## 74.5 / *Education—Curriculum and Instruction*

### 74.5.1 / ELEMENTARY EDUCATION

ED CI 200. *Student Teaching in the Elementary School.* ♦6 (100 hrs.).

ED CI 205. *Curriculum and Instruction in Elementary School Social Studies.* ♦3 (either term, 3L).

ED CI 209. *Curriculum and Instruction in Elementary School Art.* ♦3 (either term, 3L).

ED CI 213. *Curriculum and Instruction in Elementary School Music.* ♦3 (either term, 3L).

ED CI 215. *Music Education for Recreation Teachers.* ♦3 (either term, 3-0).

ED CI 221. *Curriculum and Instruction in Elementary School Reading.* ♦3 (either term, 3L).

ED CI 227. *Curriculum and Instruction in Elementary School Mathematics.* ♦3 (either term, 3L).

ED CI 231. *Curriculum and Instruction in Elementary School Science.* ♦3 (either term, 3L).

ED CI 237. *Curriculum and Instruction in Elementary School Language.* ♦3 (either term, 3L).

PE 237. *Physical Education Curriculum and Instruction (Elementary).* ♦3 (either term, 1-2).

ED CI 309. *Teaching Strategies and Material in the Art Education Laboratory.* ♦3 (either term, 3L).

ED CI 325. *Introduction to Early Childhood Education.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate.

ED CI 331. *Introduction to Second Language Teaching in the Elementary School.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate and at least one course in French or consent of the Department.

ED CI 333. *The Teaching of French to Native Speakers of French.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate and at least one course in French or consent of the Department.

ED CI 335. *Methods and Programs in the Teaching of French as a Second Language.* ♦3 (either term, 3-0). Prerequisite: ED CI 331 or consent of the Department.

ED CI 337. *Introduction to the Teaching of English as a Second Language.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate.

ED CI 339. *Methods and Programs in the Teaching of English as a Second Language.* ♦3 (either term, 3-0). Prerequisite: ED CI 337 or consent of the Department.

ED CI 341. *Introduction to Speech Education.* ♦3 (either term, 3L).

ED CI 343. *Speech in the Elementary School.* ♦3 (either term, 3L).

ED CI 345. *Introduction to School Libraries.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate.

ED CI 347. *School Library Services.* ♦3 (either term, 3-0). Prerequisite: ED CI 345 or consent of the Department.

ED CI 361. *Audio-Visual Methods in Teaching I.* ♦3 (either term, 3L).

ED CI 363. *Audio-Visual Methods in Teaching II.* ♦3 (either term, 3L). Prerequisite: ED CI 361.

ED CI 400. *Student Teaching in the Elementary School.* ♦6 (100 hours). Corequisite: ED CI 402.

ED CI 402. *Curriculum and Instruction in the Elementary School I.* ♦6 (3-0).

ED CI 404. *Curriculum and Instruction in the Elementary School II.* ♦6 (3-0).

ED CI 405. *Instruction in Elementary School Social Studies.* ♦3 (either term, 3-0). Prerequisite: ED CI 205 or equivalent.

ED CI 407. *Curriculum in Elementary School Social Studies.* ♦3 (either term, 3-0). Prerequisites: ED CI 405 and at least one course in social science or history or consent of the Department.

ED CI 410. *Art in the Elementary School.* ♦6 (3-0). Prerequisites: ED CI 209 or equivalent, and at least one laboratory or studio course in art.

ED CI 414. *Music in the Elementary School.* ♦6 (3-3). Prerequisites: ED CI 213 or equivalent, and at least one course in music.

ED CI 417. *The Reading Process: Theory and Observation.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate.

ED CI 419. *Reading in Early Childhood Education.* ♦3 (either term, 3-0). Prerequisite: ED CI 221 or equivalent.

ED CI 421. *Reading in Upper Elementary School.* ♦3 (either term, 3-0). Prerequisite: ED CI 221 or equivalent.

ED CI 423. *Special Problems in Reading.* ♦3 (either term, 3-0). Prerequisites: ED CI 417 and at least two years teaching experience or consent of department.

ED CI 425. *Teaching Literature in Elementary Schools.* ♦3 (either term, 3-0).

ED CI 426. *Curriculum and Instruction in Early Childhood Education.* ♦6 (3-3). Prerequisite: a teaching certificate or consent of the department.

ED CI 427. *Instruction in Elementary School Mathematics.* ♦3 (either term, 3-0). Prerequisite: ED CI 227 or equivalent.

ED CI 429. *Curriculum in Elementary School Mathematics.* ♦3 (either term, 3-0). Prerequisites: ED CI 427 and at least one course in mathematics or consent of department.

ED CI 431. *Instruction in Elementary School Science.* ♦3 (either term, 3-0). Prerequisite: ED CI 231 or equivalent.

ED CI 433. *Curriculum in Elementary School Science.* ♦3 (either term, 3-0). Prerequisites: ED CI 431 and at least one laboratory science course or consent of department.

ED CI 437. *Instruction in Elementary School Language.* ♦3 (either term, 3-0). Prerequisite: ED CI 237 or equivalent.

ED CI 439. *Curriculum in Elementary School Language.* ♦3 (either term, 3-0). Prerequisite: ED CI 237 or equivalent.

ED CI 446. *Selection and Organization of Library Materials.* ♦6 (3-1). Prerequisite: ED CI 347 or consent of department.

ED CI 451. *Reading in Junior High School.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate.

ED CI 453. *Reading in Senior High School.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate.

ED CI 462. *Audio-Visual Communication in Teaching and Learning.* ♦6 (3L). Prerequisite: ED CI 361.

ED CI 465. *Audio-Visual Communications: Preparation of Instructional Materials.* ♦3 (either term, 3-0). Prerequisite: ED CI 361.

ED CI 475. *The Use of Computers in the Teaching and Learning of Mathematics.* ♦3 (either term, 3-0). Prerequisite: ED CI 270 or consent of department.

ED CI 500. *Seminar.* Reports and discussion by staff and graduate students to provide candidates for advanced degrees with experience in the selection and evaluation of research problems and procedures. The seminar will be offered as arranged. No course credit will be given.

ED CI 501. *Seminar in Elementary Education.* ♦3 (either term, 3-0). Prerequisite: consent of department.

ED CI 502. *Research Seminar.* ♦6 (3-0). Prerequisite: consent of department.

ED CI 503. *Directed Individual Study in Elementary Education.* ♦3 (either term, 3-0). Prerequisite: consent of department.

ED CI 506. *Program Development in Elementary Social Studies.* ♦6 (3-0). Prerequisite: ED CI 407 or consent of Department.

ED CI 509. *Program Development in the Performance Aspect of the Art Curriculum.* ♦3 (either term, 3-0). Prerequisite: ED CI 410 or consent of department.

ED CI 511. *Program Development in the Analytical and Historical Aspects of the Art Curriculum.* ♦3 (either term, 3-0). Prerequisite: ED CI 410 or consent of department.

ED CI 514. *Program Development in Elementary School Music.* ♦6 (3-0). Prerequisite: ED CI 414 or consent of department.

ED CI 518. *Physiology and Psychology of Reading.* ♦6 (3-0). Prerequisite: ED CI 417 or consent of department.

ED CI 520. *Clinical Study of Remedial Reading.* ♦6 (3-3). Prerequisite: ED CI 518 and consent of department.

ED CI 522. *Organization and Supervision of the Reading Program.* ♦6 (3-0). Prerequisite: ED CI 417 or consent of department.

ED CI 526. *Program Development in Early Childhood Education.* ♦6 (3-0). Prerequisite: ED CI 326 or consent of department.

ED CI 528. *Program Development in Elementary School Mathematics.* ♦6 (3-0). Prerequisite: ED CI 429 or consent of department.

ED CI 532. *Program Development in Elementary School Science.* ♦6 (3-0). Prerequisite: ED CI 433 or consent of department.

ED CI 536. *Program Development in Second Languages at the Elementary Level.* ♦6 (3-0). Prerequisite: ED CI 333, 335 or 339 or consent of department.

ED CI 538. *Program Development in Elementary School Language.* ♦6 (3-0). Prerequisite: ED CI 437 or ED CI 439 or equivalent.

ED CI 580. *Curriculum Development.* ♦6 (3-0). Curriculum research, theory and practice with particular reference to curriculum aims, content, organization, and change.

ED CI 602. *Conference Course in Elementary Education.* ♦6.

ED CI 618. *Research in Reading.* ♦6. Prerequisite: ED CI 254 or 454, or consent of department.

ED CI 628. *Research in Mathematics Education.* ♦6.

ED CI 638. *Research in Language.* ♦6.

## 74.5.2 / SECONDARY EDUCATION

ED CI 250. *Student Teaching in the Secondary School.* ♦6 (100 hrs.).

ED CI 254. *Curriculum and Instruction in Secondary School English.* ♦6 (3-0). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 258. *Curriculum and Instruction in Secondary School Foreign Language.* ♦6 (3-0). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 266. *Curriculum and Instruction in Secondary School Social Studies.* ♦6 (3-0). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 270. *Curriculum and Instruction in Secondary School Mathematics.* ♦6 (3-0). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 274. *Curriculum and Instruction in Secondary School Biological Sciences.* ♦6 (3L). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 278. *Curriculum and Instruction in Secondary School Physical Sciences.* ♦6 (3L). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 282. *Curriculum and Instruction in Secondary School Business Education.* ♦6 (3-0). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 286. *Curriculum and Instruction in Secondary School Household Economics.* ♦6 (3-0). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 290. *Curriculum and Instruction in Secondary School Art.* ♦6 (3-0). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 292. *Curriculum and Instruction in Secondary School Music.* ♦6 (3-0). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 294. *Curriculum and Instruction in Secondary School Drama.* ♦6 (3-0). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 298. *Curriculum and Instruction in Secondary School Physical Education.* ♦6 (3-0). Prerequisites or corequisites: three full courses on the major pattern.

ED CI 341. *Introduction to Speech Education.* ♦3 (either term, 3L). Prerequisite: a teaching certificate.

ED CI 345. *Introduction to School Libraries.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate.

ED CI 347. *School Library Services.* ♦3 (either term, 3-0). Prerequisite: ED CI 345 or consent of department.

ED CI 353. *Speech in the Secondary School.* ♦3 (either term, 3L). Prerequisite: ED CI 341.

ED CI 361. *Audio-Visual Methods in Teaching I.* ♦3 (either term, 3L).

ED CI 363. *Audio-Visual Methods in Teaching II.* ♦3 (either term, 3LQ. Prerequisite: ED CI 361.

ED CI 417. *The Reading Process: Theory and Observation.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate.

ED CI 423. *Special Problems in Reading.* ♦3 (either term, 3-0). Prerequisites: ED CI 417 and at least two years of teaching experience or consent of department.

ED CI 446. *Selection and Organization of Library Materials.* ♦6 (3-1). Prerequisite: ED CI 347 or consent of department.

ED CI 450. *Student Teaching in Secondary School.* ♦6 (100 hours).

ED CI 451. *Reading in Junior High School.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate.

ED CI 453. *Reading in Senior High School.* ♦3 (either term, 3-0). Prerequisite: a teaching certificate.

ED CI 454. *Curriculum and Instruction in Secondary School English.* ♦6 (3-0). Prerequisites or corequisites: five full courses on the major pattern.

ED CI 455. *Teaching Literature in the Secondary School.* ♦3 (either term, 3-0).

ED CI 457. *Teaching Language and Composition in the Secondary School.* ♦3 (either term, 3-0).

ED CI 458. *Curriculum and Instruction in Secondary School Foreign Languages.* ♦6 (3-0). Prerequisites or corequisites: five full courses on the major pattern.

ED CI 459. *New Approaches to Foreign Language Instruction.* ♦3 (either term, 3-0).

ED CI 461. *Advanced Curriculum and Instruction in Foreign Language Teaching.* ♦3 (either term, 3-0).

ED CI 462. *Audio-Visual Communication in Teaching and Learning.* ♦6 (either term, 3L). Prerequisite: ED CI 361.

ED CI 465. *Audio-Visual Communications: Preparation of Instructional Materials.* ♦3 (either term, 3-0). Prerequisite: ED CI 361.

ED CI 466. *Curriculum and Instruction in Secondary School Social Studies.* ♦6 (3-0). Prerequisites or corequisites: five full courses on the major pattern.

ED CI 468. *Advanced Curriculum and Instruction in Secondary School Social Sciences.* ♦6 (3-0). Prerequisite: ED CI 266 or 466, or consent of department.

ED CI 470. *Curriculum and Instruction in Secondary School Mathematics.* ♦6 (3-0). Prerequisites or corequisites: five full courses on the major pattern.

ED CI 471. *Modern Curriculum Problems in Secondary School Mathematics.* ♦3 (either term, 3-0).

ED CI 473. *Instruction in Modern Secondary School Mathematics.* ♦3 (either term, 3-0).

ED CI 474. *Curriculum and Instruction in Secondary School Biological Sciences.* ♦6 (3L). Prerequisites or corequisites: five full courses on the major pattern.

ED CI 475. *The Use of Computers in the Teaching and Learning of Mathematics.* ♦3 (either term, 3-0). Prerequisite: ED CI 270 or consent of department.

ED CI 476. *Advanced Curriculum and Instruction in Secondary School Biological Sciences.* ♦6 (3L). Prerequisite: ED CI 274 or 474, or consent of department.

ED CI 478. *Curriculum and Instruction in Secondary School Physical Sciences.* ♦6 (3L). Prerequi-

sites or corequisites: five full courses on the major pattern.

ED CI 480. *Advanced Curriculum, Instruction and Evaluation in Secondary School Physical Sciences.* ♦6 (3L). Prerequisite: ED CI 278 or 478, or consent of department.

ED CI 482. *Curriculum and Instruction in Secondary School Business Education.* ♦6 (3-0). Prerequisites or corequisites: five full courses on the major pattern, including ED BUS 246 or 346, and ED BUS 248 or 348 or 350.

ED CI 484. *Advanced Curriculum and Instruction in Secondary School Business Education.* ♦6 (3-0). Prerequisite: ED CI 282 or 482, or consent of department.

ED CI 486. *Curriculum and Instruction in Secondary School Household Economics.* ♦6 (3-0). Prerequisites or corequisites: five full courses on the major pattern.

ED CI 488. *Advanced Curriculum and Instruction in Secondary School Household Economics.* ♦6 (3-0). Prerequisite: ED CI 286 or 486 or consent of department.

ED CI 490. *Curriculum and Instruction in Secondary School Art.* ♦6 (3-0). Prerequisites or corequisites: five full courses on the major pattern.

ED CI 492. *Curriculum and Instruction in Secondary School Music.* ♦6 (3-0). Prerequisites or corequisites: five full courses on the major pattern.

ED CI 494. *Curriculum and Instruction in Secondary School Drama.* ♦6 (3-0). Prerequisites or corequisites: five full courses on the major pattern.

ED CI 496. *Advanced Curriculum and Instruction in the Fine Arts—Music, Art or Drama.* ♦6 (either term, 6L). Prerequisite: consent of department.

ED CI 498. *Curriculum and Instruction in Secondary School Physical Education.* ♦6 (3-0). Prerequisite: BPE degree or consent of department.

ED CI 509. *Program Development in the Performance Aspect of the Art Curriculum.* ♦3 (either term, 3-0). Prerequisite: ED CI 410 or consent of department.

ED CI 511. *Program Development in the Analytical and Historical Aspects of the Art Curriculum.* ♦3 (either term, 3-0). Prerequisite: ED CI 410 or consent of department.

ED CI 518. *Physiology and Psychology of Reading.* ♦6 (3-0). Prerequisite: ED CI 417 or consent of department.

ED CI 520. *Clinical Study of Remedial Reading.* ♦6 (3-3). Prerequisite: ED CI 518 and consent of department.

ED CI 522. *Organization and Supervision of the Reading Program.* ♦6 (3-0). Prerequisite: ED CI 417 or consent of department.

ED CI 550. *Secondary Education Seminar*—Reports and discussion by staff and graduate students to provide candidates for advanced degrees with experience in the selection and evaluation of research problems and procedures. The seminar will be offered as arranged. No course credit will be given.

ED CI 561. *Organization and Supervision of the Audio-Visual Media Program.* ♦3 (either term, 3-0). Prerequisite: ED CI 361.

ED CI 562. *Curricular Integration of Audio-Visual Materials.* ♦6 (3-0). Prerequisite: ED CI 361.

ED CI 563. *Television in Education: Production and Use.* ♦3 (either term, 3-0). Prerequisite: ED CI 361.

ED CI 565. *Television in Education: Direction and Script Writing.* ♦3 (either term, 3-0). Prerequisite: ED CI 361.

ED CI 580. *Curriculum Development.* ♦6 (3-0). Curriculum, research, theory and practice with particular reference to curriculum aims, content, organization, and change.

ED CI 680. *Secondary Education.* ♦6. Reading and discussion of research, curriculum, and teaching procedures in *one* of the major fields of the secondary school.

## 74.6 / *Education—Foundations*

ED FDN 201. *Introduction to Education.* ♦3 (either term, 3-0).

ED FDN 301. ♦3 (either term, 3-3). Open only to students in the Dental Auxiliary program.

ED FDN 403. *Sociology in the Educational Context.* ♦3 (First Term, 3-0). [Not open to students with credit in Sociology 202 or Sociology 403.]

ED FDN 413. *Society and Education.* ♦3 (First Term, 3-0). Prerequisite: Sociology 202 or Sociology 403 or ED FDN 403 or equivalent.

ED FDN 415. *The School and Community.* ♦3 (Second Term, 3-0). Prerequisite Sociology 202 or Sociology 403 or ED FDN 403 or equivalent.

INTER D 416. *Anthropology and Education.* ♦6 (3-0). Prerequisite: a basic course in anthropology, or consent of department.

ED FDN 417. *The School as a Social System.* ♦3 (either term, 3-0). Prerequisite: Sociology 202 or Sociology 403 or ED FDN 403 or equivalent.

ED FDN 419. *Student and Youth Groups.* ♦3 (either term, 3-0). Prerequisite: Sociology 202 or Sociology 403 or ED FDN 403 or equivalent.

ED FDN 447. *A Selected Philosopher on Education.* ♦3 (either term, 3-0).

ED FDN 452. *Issues in Contemporary Education.* ♦6 (3-0). A critical examination of selected educational issues with special reference to Canada.

ED FDN 471. *Contemporary Systems of Education in Western Europe, the U.S.A. and the U.S.S.R.* ♦3 (either term, 3-0).

ED FDN 473. *Contemporary Systems of Education in Selected Countries of Asia and Africa.* ♦3 (either term, 3-0).

ED FDN 481. *History of Education in a Selected Period.* ♦3 (either term, 3-0).

ED FDN 485. *History of Canadian Education Before 1867.* ♦3 (either term, 3-0).

ED FDN 487. *History of Canadian Education After 1867.* ♦3 (either term, 3-0).

ED FDN 492. *Philosophy of Education.* ♦6 (3-0). A philosophical examination of the logical connection between philosophical theories and recommendations about the aims and practices of education. Attention will be given to the analysis of conceptual problems involved in the understanding and assessment of educational theory and practice. Prerequisite: Philosophy 240 or 242. For holders of approved degrees other basic philosophy courses may be accepted by the department.

ED FDN 496. *History of Educational Thought.* ♦6 (3-0). A historical study of the significance of the contributions of thinkers whose intellectual activities have influenced educational theories and practices in the Western World. Prerequisite: Philosophy 240 or 242. For holders of approved degrees other basic philosophy courses may be accepted by the department.

ED FDN 500. *Education Seminar.* Non-credit; hours to be arranged.

ED FDN 502. *Conference Course on Selected Topics.* ♦6 (3-0).

ED FDN 513. *Development and Theory of Sociology of Education.* ♦3 (either term, 3-0).

ED FDN 515. *Contemporary Issues and Research in Sociology of Education.* ♦3 (either term, 3-0).

ED FDN 526. *Anthropological Theory and Education.* ♦6 (3-0).

ED FDN 531. *Philosophical Analysis of Teaching.* ♦3 (either term, 3-0).

ED FDN 532. *Philosophical Foundations of Educational Research.* ♦6 (3-0).

ED FDN 546. *Soviet and East European Studies: An Interdisciplinary Seminar.* ♦6 (3-0).

ED FDN 571. *Studies of Educational Change in Western Nations.* ♦3 (either term, 3-0).

ED FDN 573. *Functions of Education in the Development of Emerging Nations.* ♦3 (either term, 3-0).
ED FDN 581. *History of Education in Western Europe Before 1900.* ♦3 (either term, 3-0).
ED FDN 583. *History of Education in the United States Before 1900.* ♦3 (either term, 3-0).
ED FDN 585. *History of Education in Eastern Canada.* ♦3 (either term, 3-0).
ED FDN 587. *History of Education in Western Canada.* ♦3 (either term, 3-0).
ED FDN 589. *History of Education: Method and Structure.* ♦3 (either term, 3-0).
ED FDN 592. *Philosophy of Education.* ♦6 (3-0).
ED FDN 602. *Conference Course on Selected Topics.* ♦varies from 3 to 6.

## 74.7 / *Education—Industrial Arts*

ED IA 203. *Introduction to Industrial Arts.* ♦3 (First Term, 3-0).
ED IA 251. *Student Teaching*—Part I of ED CI 250. (50 hours).
ED IA 253. *Student Teaching*—Part II of ED CI 250. (50 hours).
ED IA 260. *General Industrial Arts.* ♦6 (3-6). Prerequisite or corequisite: ED IA 203.
ED IA 270. *Introduction to Technology.* ♦6 (3-6).
ED IA 350. *Educational Programs and Practices in Industry and Labor.* ♦6 (3-0).
ED IA 360. *Laboratory of Technology.* ♦6 (2-4).
ED IA 370. *Technology I.* ♦6 (2-4). Prerequisite: ED IA 270.
ED IA 451. *Student Teaching*—Part I of ED CI 450. (50 hours).
ED IA 453. *Student Teaching*—Part II of ED CI 450. (50 hours).
ED IA 460. *Technology II.* ♦6 (2-4). Prerequisite: ED IA 270.
ED IA 470. *Technology III.* ♦6 (2-4). Prerequisite: ED IA 270.
ED IA 589. *Organization of Industrial Arts Education.* ♦3 (either term, 3-0).
ED IA 591. *Problems and Trends in Industrial Arts Education.* ♦3 (either term, 3-0).
ED IA 594. *Research and Development Seminar in Industrial Arts Education.* ♦6 (3-0).

## 74.8 / *Education—Psychology*

ED PSY 269. *Introduction to Educational Psychology: Maturation and Development.* ♦3 (either term, 3-0).
ED PSY 271. *Introduction to Educational Psychology: Learning.* ♦3 (either term, 3-0).
ED PSY 351. *Psychology and Education of the Hard of Hearing and the Deaf.* ♦3 (either term, 3-0). Prerequisite: ED PSY 354 or consent of department.
ED PSY 353. *Psychology and Education of the Mentally Retarded.* ♦3 (either term, 3-0). Prerequisites or corequisites: ED PSY 354 or consent of department.
ED PSY 354. *Psychology and Education of Exceptional Children.* ♦6 (3-1).
ED PSY 355. *Psychology and Education of the Gifted.* ♦3 (either term, 3-0). Prerequisite or corequisite: ED PSY 354 or consent of department.
ED PSY 357. *Psychology and Education of the Crippled and Neurologically Impaired.* ♦3 (either term, 3-0). Prerequisite or corequisite: ED PSY 354 or consent of department.
ED PSY 359. *Psychology and Education of the Emotionally Disturbed and Socially Maladjusted.* ♦3 (either term, 3-0). Prerequisite or corequisite: ED PSY 354 or consent of department.
ED PSY 411. *Introduction to Guidance.* ♦3 (either term, 3-0). Prequisites: ED PSY 269 and 271 or equivalents.
ED PSY 421. *Personal and Social Dynamics in Education.* ♦3 (either term, 3-0). Prerequisites: ED PSY 269 and 271 or equivalents.
ED PSY 451. *Practicum in the Psychology and Education of the Hard-of-Hearing and the Deaf.* ♦3 (either term, 3L). Prerequisite or corequisite: ED PSY 351.
ED PSY 453. *Practicum in the Psychology and Education of the Mentally Retarded.* ♦3 (either term, 3L). Prerequisite or corequisite: ED PSY 353.
ED PSY 455. *Practicum in the Psychology and Education of the Gifted.* ♦3 (either term, 3L). Prerequisite or corequisite: ED PSY 355.
ED PSY 457. *Practicum in the Psychology and Education of the Crippled and Neurologically Impaired.* ♦3 (either term, 3L). Prerequisite or corequisite: ED PSY 357.
ED PSY 459. *Practicum in the Psychology and Education of the Emotionally Disturbed and Socially Maladjusted.* ♦3 (either term, 3L). Prerequisite or corequisite: ED PSY 359.
ED PSY 469. *Human Development and Education.* ♦3 (either term, 3-0). Prerequisite: ED PSY 269 or equivalent.
ED PSY 471. *Learning and Instruction.* ♦3 (either term, 3-0). Prerequisite: ED PSY 271 or equivalent.
ED PSY 473. *Language and Cognition in the Education of the Child.* ♦3 (either term, 3-0). Prerequisites: ED PSY 269 and 271 or equivalents.
ED PSY 475. *Individual Differences in Education.* ♦3 (either term, 3-0). Prerequisites: ED PSY 269 and 271 or equivalents.
ED PSY 487. *The Measurement of Educational Objectives.* ♦3 (either term, 3-0). Prerequisites: ED PSY 269 and 271 or equivalents.
ED PSY 489. *Test Construction for Teachers.* ♦3 (either term, 3-0). Prerequisites: ED PSY 269 and 271 or equivalents.
ED PSY 497. *Senior Seminar in Educational Psychology.* ♦3 (either term, 3-0). Prerequisite: consent of department.
ED PSY 499. *Directed Individual Study in Educational Psychology.* ♦3 (either term, 3-0). Prerequisite: consent of department.
ED PSY 500. *Education Seminar*—Reports by Staff and Graduate Students. No course credit given.
ED PSY 502. *Introduction to Educational Research.* ♦6 (3-1).
ED PSY 504. *Statistics and Research Design in Education.* ♦6 (3-1). Prerequisite: ED PSY 502 or equivalent.
ED PSY 511. *Vocational Development and Choice.* ♦3 (either term, 3-0).
ED PSY 512. *Seminar and Practicum in Individual Counselling.* ♦6 (3-3). Prerequisite or corequisite: ED PSY 515 or equivalent and consent of department.
ED PSY 513. *Group Assessment in Guidance and Counselling.* ♦3 (either term, 3-1). Prerequisite: ED PSY 487 or equivalent.
ED PSY 515. *Theories of Personality.* ♦3 (either term, 3-0).
ED PSY 517. *Group Processes in the School.* ♦3 (either term, 3-0).
ED PSY 518. *Seminar and Practicum in Group Counselling.* ♦6 (3-3). Prerequisites: ED PSY 517, 512 and consent of department.
ED PSY 519. *Seminar in Elementary School Counselling.* ♦3 (either term, 3-0).
ED PSY 520. *Seminar and Practicum in School Psychology.* ♦6 (3-3). Prerequisite: ED PSY 524 or equivalent and consent of department.
ED PSY 524. *Individual Diagnosis in School Psychology.* ♦6 (3-3). Prerequisite: consent of department.

ED PSY 548. *Psychology and Education of Exceptional Children.* ♦6 (3-1). Course for teachers of exceptional children and personnel serving in supervisory roles in special education.

ED PSY 550. *Psychology and Education of Hearing Handicapped Children.* ♦6 (3-1).

ED PSY 552. *Psychology and Education of Mentally Retarded Children.* ♦6 (3-1).

ED PSY 554. *Psychology and Education of Gifted Children.* ♦6 (3-1).

ED PSY 556. *Psychology and Education of Physically Handicapped Children.* ♦6 (3-1).

ED PSY 558. *Psychology and Education of Emotionally Disturbed and Socially Maladjusted Children.* ♦6 (3-1).

ED PSY 560. *Seminar and Research in Developmental Psychology.* ♦6 (3-3). Prerequisite: ED PSY 569 or equivalent and consent of department.

ED PSY 562. *Educational Psychology in the Soviet Union and Eastern Europe.* ♦6 (3-0). Prerequisite: consent of department.

ED PSY 568. *Seminar and Research in Learning.* ♦6 (3-3). Prerequisite: ED PSY 571 or equivalent and consent of department.

ED PSY 569. *Advanced Educational Psychology: Development.* ♦3 (either term, 3-0).

ED PSY 571. *Advanced Educational Psychology: Learning.* ♦3 (either term, 3-0).

ED PSY 580. *Seminar and Research in Educational Measurement.* ♦6 (3-3). Prerequisites: ED PSY 487 and 502 or equivalents.

ED PSY 592. *Seminar and Research in the Social Psychology of School and Classroom.* ♦6 (3-3). Prerequisites: ED PSY 502 and 517 or equivalents.

ED PSY 597. *Special Seminars.* ♦3 (either term, 3-0). Prerequisite: consent of department.

ED PSY 598. *Special Seminars.* ♦6 (3-0). Prerequisite: consent of department.

ED PSY 599. *Individual Directed Reading and Research.* ♦3 (either term, 3-0). Prerequisite: consent of department.

ED PSY 610. *Guidance and Counselling.* ♦6.

ED PSY 620. *Personality, Affect, and Cognition.* ♦6.

ED PSY 630. *School Psychology.* ♦6.

ED PSY 640. *Special Education.* ♦6.

ED PSY 660. *Developmental Psychology.* ♦6.

ED PSY 676. *Psychology of Learning.* ♦6.

ED PSY 680. *Educational Measurement.* ♦6.

## 74.9 / *Education—Vocational*

ED VOC 204. *Vocational Education*—History, comparative studies, aims and objectives. ♦6 (3-0).

ED VOC 223, 323, 333 and 423 (116 weeks). Practicums. No credit. [Only open to students in Vocational Education, Route II.]

ED VOC 279. *Curriculum and Instruction in Vocational Education I.* ♦3 (First Term, 3-0).

ED VOC 281. *Curriculum and Instruction in Vocational Education II.* ♦3 (Second Term, 3-0). Prerequisite: ED VOC 279.

ED VOC 350. *Educational Programs and Practices in Industry and Labor.* ♦6 (3-0).

ED VOC 361. *Industrial and Vocational Specialization I.* ♦3 (either term, 3L).

ED VOC 404. *Vocational Education*—Orientation to vocational education. ♦6 (3-0).

ED VOC 461. *Industrial and Vocational Specialization II.* ♦3 (either term, 3L). Prerequisite: ED VOC 361 or consent of department.

ED VOC 479. *Curriculum and Instruction in Vocational Education I.* ♦3 (First Term, 3-0).

ED VOC 481. *Curriculum and Instruction in Vocational Education II.* ♦3 (Second Term, 3-0). Prerequisite: ED VOC 479.

ED VOC 550. *Vocational Guidance—Conference Seminar.* ♦6 (1-3).

ED VOC 589. *Organization of Vocational Education.* ♦3 (either term, 3-0).

ED VOC 591. *Problems and Trends in Vocational Education.* ♦3 (either term, 3-0).

ED VOC 594. *Research and Development Seminar in Vocational Education.* ♦6 (3-0).

## 74.10 / *Courses Offered by Other Faculties*

### 74.10.1 / ART

ART 231. *Fundamentals of Visual Communication I.* ♦6 (2-4). A studio-based course concerned with the analysis of information expressed visually in two and three dimensions, and with illusion implied by line and colour.

### 74.10.2 / BIOLOGY

BIOL 130. *Introductory Biology.* ♦6 (3-3). Note: not open to students with credit in Biology 30.

BIOL 230. *Intermediate Biology.* ♦6 (3-3). Prerequisite: Biology 30 or Biology 130. Note: designed for students with High School Biology 30.

### 74.10.3 / CHEMISTRY

CHEM 230. *Inorganic Chemistry.* ♦6 (3-1s-3). Lectures: The fundamental concepts of Chemistry as applied to the elements and their compounds. Laboratory: The preparation of some compounds; quantitative chemistry. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

CHEM 250. *Organic Chemistry.* ♦6 (3-1s*-3). Lectures: An introduction to a study of the compounds of carbon. Laboratory: The preparation of some organic compounds. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent. [*Students not concurrently taking Chemistry 230 are required to take the one hour seminar.]

### 74.10.4 / DRAMA

DRAMA 240. *Voice and Speech.* 6 (4L). Intensive voice and speech improvement; oral interpretation of poetry, prose and dramatic literature.

DRAMA 252. *Improvization.* ♦6 (6L). Speech improvization and creative movement with emphasis on imaginative development.

### 74.10.5 / ENGLISH

ENGL 200. *A Survey of English Literature from Chaucer to the Twentieth Century.* ♦6 (3-0). A close study of representative masterpieces. Essays and tests on the prescribed literature will be given to afford practice in setting down ideas in good English.

ENGL 210. *English Language and Literature.* ♦6 (3-0). Designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

ENGL 288. *An Introduction to the English Language.* ♦6 (3-0). A historical and structural study of the sounds, grammar, and vocabulary of English.

ENGL 398. *Children's Literature.* ♦6 (3-0). A historical and critical study of literature written for children, with attention to the interaction between children's literature and educational theory. The course will bring to the attention of prospective elementary teachers some of the world's resources in good books for children. Prerequisite: English 200, 210, or 230. This course is limited to B.Ed. students in the elementary route.

## 74.10.6 / FRENCH

FREN 201. *First Year University French for Teachers.* ♦6 (2-3). This course is designed to teach all future teachers of French to speak the language. It consists of three laboratory hours of oral work, and two hours of grammar per week.

FREN 230. *Advanced First Year University French.* ♦6 (3-2). A course designed for students having French 31, and honors students. These and French-speaking students are advised to take this course in place of French 200 or 201. Prerequisite: consent of the department.

## 74.10.7 / GEOGRAPHY

GEOG 201. *Physical Geography.* ♦6 (3-2). A systematic study of the origin, nature, and distribution of the natural environment. Land forms, weather and climate, vegetation; laboratory work will complement the lectures and will include interpretation, study, and preparation of maps and charts.

## 74.10.8 / GERMAN

GERM 200. *First Year University German.* ♦6 (3-1). This course is devoted to the development of the student's ability in speaking, reading and writing German, using modern short stories, cultural readers and audio-visual aids. Prerequisite: German 30, German 100 or the equivalent.

## 74.10.9 / HISTORY

HIST 200. *European History.* ♦6 (3-1s). The history of Europe from the decline of the Roman Empire in the West to the present.

## 74.10.10 / HOUSEHOLD ECONOMICS

H EC 201. *Clothing Design and Selection.* ♦3 (First Term, 3-3). Practical application of principles of design in clothing selection. Becoming and appropriate clothing for the individual. Consideration of age, social and economic factors.

H EC 221. *Basic Foods I.* ♦3 (Second Term, 3-3). Scientific principles involved in preparing and handling selected foods: fruits, vegetables, cereals, flours, leaveners, sugars, batters and doughs. Prerequisite: Chemistry 250.

## 74.10.11 / LATIN

LATIN 200. *Latin Authors and Prose Composition.* ♦6 (3-0). This course is for students with matriculation in Latin 30 or with Latin 100. It is concerned with improvements in the reading of Latin and with the writing of simple Latin sentences.

## 74.10.12 / MATHEMATICS

MATH 274. *Algebra—Logic and Sets.* ♦6 (3-0). Groups, rings and fields. The number system—an axiomatic treatment. Linear algebra. Prerequisite: Mathematics 30, or equivalent.

MATH 101. *Trigonometry.* (First Term, 2-0). Trigonometric functions, equations, and identities. Solution of triangles. Logarithms. Prerequisite: 70% standing in Mathematics 30 and 70% standing in the required courses of Grade XII or special permission of the Dean. Note: This course cannot be taken for credit towards a degree. Students lacking credit in Mathematics 31 should take Mathematics 101 in their first year if they plan to take advanced courses in mathematics.

## 74.10.13 / MUSIC

MUSIC 210. *Foundations of Music.* ♦6 (2-3). The development of a musical repertory and knowledge of basic content appropriate for teacher. (Open only to B.Ed. students.

MUSIC 213. *Choral Technique and Interpretation.* ♦6 (3-0). Elementary theory and practice of singing, choral technique and interpretations, sight singing and ear training. Prerequisites:
(a) Western Board of Music Grade III Theory or equivalent and
(b) Western Board of Music Grade V practical or equivalent.

## 74.10.14 / PHYSICAL EDUCATION

PHYS ED 202. *Introduction to Elementary School Physical Education.* ♦6 (3-3). A study of children at play. Movement education leading to the development of skill in various fields of physical activity.

PHYS ED 218. (0-2). For first year men students. Fitness, aquatic and recreational activities. Tests in fitness and aquatics are administered in Term I followed by student selected recreational activities.

PHYS ED 228. (0-2). For first year women students. Foundations of physical education with an emphasis on fitness, followed by two electives in recreational activities.

PHYS ED 236. *Physical Education Activities.* ♦6 (3-0).

PHYS ED 237. *Physical Education Curriculum and Instruction (Elementary).* ♦2 (either term, 1-2). Methods and materials in the teaching of elementary school health and physical education.

PHYS ED 325. *Scientific Principles of Elementary School Physical Education.* ♦3 (either term, 3-0). A study of anatomy, physiology of exercise and kinesiology as it relates to the physical growth and development of children aged 6 to 12. Prerequisite: Physical Education 202.

PHYS ED 327. *Dance.* ♦2 (second term, 1-2). A study of the basic principles of movement and the use of these in the communication of ideas and feelings through dance and dance drama. Prerequisite: Physical Education 202 or consent of the Department.

PHYS ED 336. *Physical Education Activities.* ♦6 (3-0).

PHYS ED 362. *Human Anatomy.* ♦6 (3-0).

PHYS ED 363. *Kinesiology.* ♦3 (First Term, 3-0).

PHYS ED 371. *Scientific Bases of Athletic Conditioning and Training.* ♦3 (Second Term, 1-2).

PHYS ED 391. *Health Education in Secondary Schools.* ♦3 (First Term, 3-0). Personal and environmental school health with special emphasis on methods and materials in health instruction.

PHYS ED 419. *Problems and Trends in Elementary School Health and Physical Education.* ♦3 (Second Term, 3-0). Prerequisite: Physical Education 202, Physical Education 325, Physical Education 327, Physical Education 422.

PHYS ED 422. *Individual and Team Activities.* ♦4 (2-2). Prerequisite: Physical Education 202 and Junior Red Cross Swimming award or equivalent.

PHYS ED 429. *Advanced Gymnastics and Dance.* ♦3 (First Term, 3-3). Students will be encouraged to specialize in one area. Prerequisite: Physical Education 202, Physical Education 325, Physical Education 327, Physical Education 422.

PHYS ED 436. *Physical Education Activities.* ♦6 (3-0).

PHYS ED 442. *Administration of Physical Education.* ♦6 (3-0).

PHYS ED 492. *Community Health.* ♦6 (3-2). Consideration of current research of disease concept and examination of community attitudes and pressures affecting health education. Field research includes hospitals, clinics, institutions and schools.

## 74.10.15 / RUSSIAN

RUSS 100. *Beginners' Russian* (Arts Section). ♦6 (3-2). An elementary course designed to give a working knowledge of the Russian language, including the essentials of grammar, reading, and drill on useful expressions.

## 74.10.16 / SOCIOLOGY

SOC 202. *Introductory Sociology.* ♦6 (3-0). An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society is analysed in terms of its structure, culture and social ranking schemes. The interrelationships between the various institutions (e.g. family, church, school, government) are considered. The processes are examined whereby the individual is socialized into society, as are the sources of conformist and non-conformist behavior. Note: Third year or more advanced students are encouraged to take Sociology 403 rather than 202.

## 74.10.17 / UKRAINIAN

UKR 200. *First Year University Ukrainian.* ♦6 (3-1). Primarily designed for students having some previous knowledge of Ukrainian. A brief review of phonology, an intensive study of grammar, readings of selected texts from modern Ukrainian literature, and elementary composition supplemented by laboratory work in conversational Ukrainian. Prerequisite: Ukrainian 30 or the consent of the department.

*Dr. R. M. Hardy (seated), Dean of the Faculty of Engineering, with Associate Dean L. E. Gads.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# *Faculty of Engineering*

## 81 / INTRODUCTORY

### 81.1 / *Members of the Faculty*

#### 81.1.1 / OFFICERS OF THE FACULTY

*Professor and Dean*
R. M. HARDY, D.Sc., F.R.S.C.

*Associate Dean*
L. E. GADS, B.Sc.

#### 81.1.2 / DEPARTMENT OF CHEMICAL AND PETROLEUM ENGINEERING

*Professor and Head*
D. B. ROBINSON, Ph.D. (on leave, 1968-69)

*Professors*
J. W. GREGG, M.Sc. (Petroleum Engineering) (part-time)
D. QUON, Sc.D. (Chemical Engineering) (on leave, 1968-69)

*Associate Professors*
I. G. DALLA LANA, Ph.D. (Chemical Engineering)
P. M. DRANCHUK, M.Sc. (Petroleum Engineering)
D. G. FISHER, Ph.D. (Chemical Engineering)
W. NADER, Dr. Phil. (Chemical Engineering)
F. D. OTTO, Ph.D. (Chemical Engineering)
D. E. SEBORG, Ph.D. (Chemical Engineering)
R. K. WOOD, Ph.D. (Chemical Engineering)

*Assistant Professors*
A. E. MATHER, Ph.D. (Chemical Engineering)
J. T. RYAN, Ph.D. (Chemical Engineering)
F. A. SEYER, Ph.D. (Chemical Engineering)

#### 81.1.3 / DEPARTMENT OF CIVIL ENGINEERING

*Professor and Head*
S. R. SINCLAIR, M.Sc.

*Professors*
T. BLENCH, D.Sc.
P. H. BOUTHILLIER, S.M.
L. E. GADS, B.Sc.
J. LONGWORTH, M.Sc.
J. G. MacGREGOR, Ph.D.
N. R. MORGENSTERN, Ph.D.

*Associate Professors*
P. G. G. ADAMS, Ph.D.
K. O. ANDERSON, M.Sc.
J. J. BAKKER, M.S.C.E.
W. L. BIGG, B.Sc.
E. L. FOWLER, M.Sc.
D. W. MURRAY, Ph.D.
J. B. NUTTALL, M.A.Sc.
A. W. PETERSON, M.Sc.
W. W. PRESTON, B.Sc.
N. RAJARATNAM, Ph.D.
S. H. SIMMONDS, Ph.D.
S. THOMSON, Ph.D.
J. P. VERSCHUREN, M.Sc.
J. WARWARUK, Ph.D.

*Sessional Lecturer*
L. BALANKO, B.Sc.

#### 81.1.4 / DEPARTMENT OF ELECTRICAL ENGINEERING

*Professor and Head*
G. B. WALKER, Ph.D.

*Professors*
Y. J. KINGMA, Ir.
P. R. SMY, Ph.D.

*Associate Professors*
P. A. GOUD, Ph.D.
V. GOURISHANKAR, Ph.D.
C. R. JAMES, Ph.D.
D. H. KELLY, M.Sc.
H. J. J. SEGUIN, Ph.D.
W. A. G. VOSS, Ph.D. (part-time)

*Assistant Professors*
G. S. CHRISTENSEN, Ph.D.
F. S. CHUTE, Ph.D.
E. M. EWARDS, M.Sc
C. G. ENGLEFIELD, Ph.D.
R. W. KING, B.Sc.
R. P. W. LAWSON, Ph.D.
A. A. OFFENBERGER, Ph.D.
G. J. PERT, Ph.D.
R. E. RINK, Ph.D.
E. SANG, D. Phil.
K. A. STROMSMOE, B.Sc. (on leave, 1968-69)
F. E. VERMEULEN, Ph.D.

*Sessional Lecturer*
E. M. EDWARDS, M.Sc.

#### 81.1.5 / DEPARTMENT OF MECHANICAL ENGINEERING

*Professor and Head*
G. FORD, Ph.D.

*Professors*
J. B. HADDOW, Ph.D.
J. S. KENNEDY, Ph.D.

*Associate Professors*
D. G. BELLOW, Ph.D.
K. C. CHENG, Ph.D.
G. S. H. LOCK, Ph.D.
D. J. MARSDEN, Ph.D.
C. M. RODKIEWICZ, Ph.D.
G. W. SADLER, M.Sc.

*Assistant Professors*
J. R. COLBOURNE, Ph.D.
E. W. JOHNSON, M.Sc. (on leave, 1968-69)

*Sessional Instructor*
D. PANAR, M.Sc.

## 81.1.6 / DEPARTMENT OF MINING AND METALLURGY

*Professor and Head*
E. O. LILGE, M.Sc.

*Professors*
T. H. PATCHING, B.Sc.
F. H. VITOVEC, Dr. Tech, Sci.

*Associate Professor*
S. A. BRADFORD, Ph.D.
J. R. FEHLING, Dr. Rer. Nat.

*Assistant Professor*
L. R. PLITT, M.Sc.

## 81.1.7 / ADDITIONAL MEMBERS OF FACULTY COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Professors*
H. E. GUNNING, Ph.D. (Chemistry)
H. S. HEAPS, M.A. (Computing Science)

*Associate Professors*
S. G. DAVIS, Ph.D. (Chemistry)
D. G. HUGHES, Ph.D. (Physics)
W. ISRAEL, Ph.D. (Mathematics)
G. SAMUEL, M.A. (English)
R. J. TAIT, Ph.D. (Mathematics)
G. D. WILLIAMS, Ph.D. (Geology)

*Assistant Professors*
S. E. DRUGGE, Ph.D. (Economics)
W. J. McDONALD, Ph.D. (Physics)

*Representative*
D. R. STANLEY, Ph.D. (Association of Professional Engineers of Alberta)

*Registrar of the University*
A. D. CAIRNS, B.A.

# 82 / FACULTY REGULATIONS

## 82.1 / *Admission and Registration*

The admission requirements of the Faculty of Engineering are set out in §§ 13.1 and 13.8 of the University Regulations section of the Calendar. Application and registration procedure are outlined in §§ 14 and 15.1. A student who encounters difficulty in registration should consult the office of the Dean.

## 82.2 / *Academic Standings and Graduation*

(1) To qualify for promotion to the subsequent year, a student must obtain a grade-point average that will be set by the Faculty for the specific year.

(2) In order to obtain the degree of B.Sc. in Engineering, the student must satisfy the following requirements: (i) a grade-point average of 4.5 or better, covering all the required courses in his undergraduate program; (ii) credit (a grade of 3 or better) in all required courses.

(3) A student who has obtained a credit in all of the courses prescribed for him in the second year of a program may be permitted registration in the third year of a different program, but because the conditions for such transfer differ from department to department, a student who contemplates changing his pattern should consult the Dean prior to registration.

(4) No credit will be given for grades of 1 or 2. A student with a grade-point average below the average required for the particular year will be required to write supplementals for all courses taken in that year in which he obtained a grade of 2 or 3. A student may also be permitted, at the discretion of the Dean's Office, to write supplementals in courses where a grade of 4 was obtained in order to raise his grade-point average.

(5) If after supplementals the student's grade-point average is below that required for promotion or graduation, he may be permitted to repeat the year and register in all courses in which he obtained a grade below 6.

(6) A student whose grade-point average is much below that required for the particular year may be required to withdraw from the Faculty. A student whose academic performance over several years is considered extremely unsatisfactory may be required to withdraw permanently from the Faculty.

## 83.1 / *The Degree of B.Sc. in Engineering: General Information*

The program for the degree of B.Sc. in Engineering begins with a common first year and increases in specialization from year to year thereafter. In the second year, while most courses are common to all routes, some options are available to give the student an introduction to a specialized field of Engineering. In the third and fourth years, each department in the Faculty offers one or more specialized patterns.

## 83.2 / *First Year*

| | *First Term Hours* | *Second Term Hours* |
|---|---|---|
| CHEM 232 (Modern Chemistry) | 3-3 | 3-3 |
| D G 151 (Drafting and Graphics) | 1-3 | 1-3 |
| ENG P 159 (Orientation to Engineering Profession) | 1-0 | — |
| ENG 250 (English) | 2-0 | 2-0 |
| MATH 214 (Introductory Calculus) | 4-2 | 4-2 |
| MEC E 152 (Statics) | 2-2s | — |
| MEC E 153 (Applied Statics and Kinematics) | — | 2-0 |
| P ED 218 or 228 (Physical Education) | 0-2 | 0-2 |
| PHYS 230 (Physics: Dynamics, Waves, and Optics) | 3-3/2-2/2s | 3-3/2-2/2s |
| Total hours per week | 16-11½-3s | 15-11½-1s |

## 83.3 / *Second Year*

### 83.3.1 / REQUIRED COURSES

| *First Term* | *Hours per week* |
|---|---|
| C E 263 (Mechanics of Deformable Bodies I) | 3-3 |
| MEC E 252 (Engineering Mechanics—Rigid Body Dynamics) | 3-0 |
| MATH 312 (Linear Algebra) | 3-2s |
| MET E 253 (Materials Science) | 3-0 |
| PHYS 330 (Electricity and Magnetism) | 4-3-2/2s |
| *Second Term* | |
| CH E 224 (Engineering Thermodynamics) | 3-1s |
| E E 254 (Fundamentals of Electrical Engineering) | 3-3/2 |
| MATH 313 (Differential Equations) | 3-2s |

### 83.3.2 / ELECTIVE COURSES (SECOND TERM)

| | *Hours per week* |
|---|---|
| *Chemical Engineering* | |
| CH E 254 (Engineering Design) | 3-3s |
| ECON 304 (Principles of Economics) | 3-0 |
| *Civil Engineering* | |
| C E 264 (Mechanics of Deformable Bodies II) | 2-0 |
| C E 251 (Engineering Surveying) | 2-2 |
| C E 252 (Survey School—Three weeks at the end of the Second Term. See Note B) | — |
| GEOL 230 (Engineering Geology I) | 3-3 |
| *Electrical Engineering* | |
| Two electives (See Note A) | |
| *Mechanical Engineering* | |
| CH E 254 (Engineering Design) | 3-3s |
| One elective (Economics 304 strongly recommended) (See Note A) | |
| *Metallurgical Engineering* | |
| ECON 304 (Principles of Economics) | 3-0 |
| One elective (See Note A) | |
| *Mining Engineering* | |
| As for Civil Engineering | |

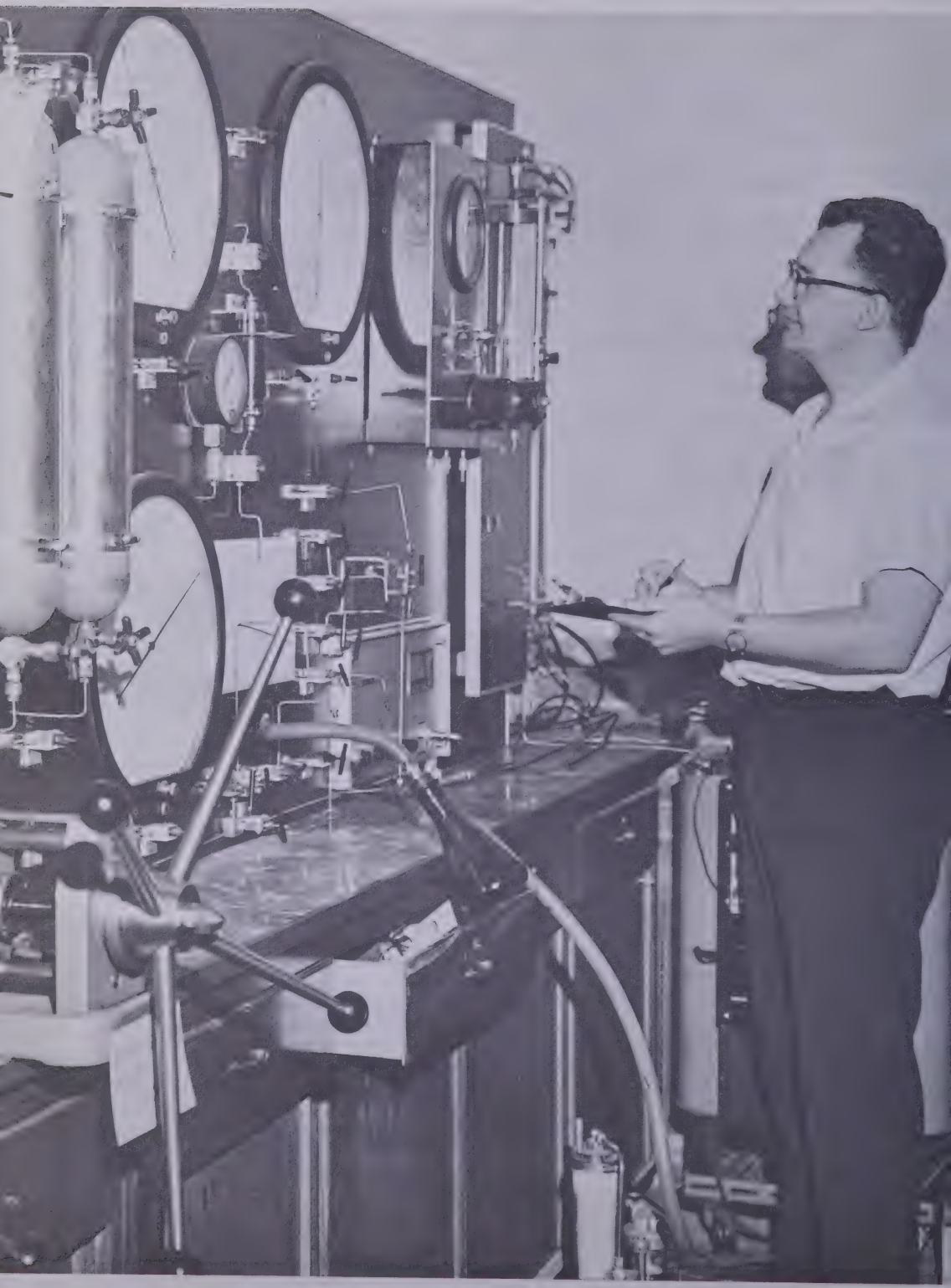
### 83.3.3 / NOTES

NOTE A: *Elective Courses.* The following elective courses are available:

| | *Hours per week* |
|---|---|
| ACCTG 202 (Fundamentals of Accounting) | 3-2 |
| AG ENG 342 (Work Study) | 3-0 |
| ANTHR 330 (Culture and Technology) | 3-0 |
| CH E 254 (Engineering Design) | 3-3s |
| C E 264 (Mechanics of Deformable Bodies II) | 2-0 |
| C E 251 (Engineering Surveying) | 2-2 |
| C E 252 (Survey School) (Three weeks at end of Second Term) | — |
| CMPUT 300 (Compiler Language Programming) | 3-0 |
| ECON 304 (Principles of Economics) | 3-0 |
| GENET 360 (Genetics) | 3-3 |
| GEOL 230 (Engineering Geology I) | 3-3 |
| HORT 341 (General Horticulture) | 3-3 |
| STAT 305 (Introductory Statistics) | 3-2 |

NOTE B: *Survey School.* If the survey school is held at a survey camp, students may be charged room and board.

NOTE C: *Irregular Programs.* Students entering third or fourth year with a high average may, with the consent of the head of the appropriate Engineering department, make some substitutions in the regular course pattern. Students with irregular programs must, however, bear in mind that departments may require prerequisites or corequisites for certain courses before registration can be approved.



*Equipment used in Petroleum Engineering to determine the properties of crude oil.*

## 83.4 / *Third and Fourth Years—Chemical Engineering*

| 83.4.1 / THIRD YEAR (1968-69 only) | *First Term Hours* | *Second Term Hours* |
|---|---|---|
| CH E 312 (Fluid Mechanics) | 3-1s | — |
| CH E 314 (Heat Transfer) | — | 3-1s |
| CH E 324 (Chemical Engineering Thermodynamics) | — | 4-1s |
| CH E 353 (Chemical Engineering Laboratory I) | | 1-4/2 |
| CH E 354 (Process Analysis) | — | 2-2s |
| STAT 335 (Probability and Statistics) | 3-2 | — |
| CHEM 350 (Organic Chemistry) | 3-3 | 3-3 |
| CHEM 370 (Physical Chemistry) | 3-3 | 3-3 |
| CH E 484 (Industrial Tours) | — | — |
| A third-year elective (hours are approximate) | 3-0 | — |
| Total hours per week | 15-8-1s | 16-8-4s |

NOTE A: Some typical elective courses (depending on timetable) are Chemical Engineering 374 (Mathematical Applications), Mathematics 413 (Partial Differential Equations I), Computing Science 458 (Numerical Analysis), Law 300 (Commercial Law for Engineers). The Department will have available a complete list of electives at time of registration.

NOTE B: A student with a high academic standing and a strong interest in the sciences may make some limited substitutions, if he wishes, in the regular course pattern.

NOTE C: All programs require the approval of the Department of Chemical and Petroleum Engineering.

| 83.4.3 / FOURTH YEAR (1968-69 only) | *First Term Hours* | *Second Term Hours* |
|---|---|---|
| CH E 410 (Mass Transfer) | 4-2s | — |
| CH E 434 (Applied Reaction Kinetics) | — | 3-1s |
| CH E 446 (Process Dynamics and Control) | 3-0 | — |
| CH E 453 (Chemical Engineering Laboratory II) | 1-4/2 | 1-4/2 |
| CH E 455 (Chemical Engineering Project) | 2-2s | 1-4s |
| CH E 482 (Colloquium) | 0-1s | 0-1s |
| CH E 484 (Industrial Tours) | — | — |
| CHEM 350 (Organic Chemistry) (those having prior credit will replace this with an elective) | 3-3 | 3-3 |
| ENG P 459 (Practice of the Engineering Profession) | — | 1-0 |
| A technical elective (hours are approximate) | — | 3-0 |
| A technical or non-technical elective (hours are approximate) | 3-0 | 3-0 |
| Total hours per week | 16-5-5s | 15-5-6s |

NOTE A: Some typical technical electives offered in the Department are: Chemical Engineering 442 (Process Dynamics), Chemical Engineering 444 (Process Control), Chemical Engineering 454 (Operations Analysis), Chemical Engineering 474 (Optimization Methods), Chemical Engineering 476 (Mathematical Applications), Petroleum Engineering 432 (Reservoir Analysis and Profitability, Primary Recovery), Petroleum Engineering 434 (Reservoir Analysis and Profitability, Enhanced Recovery).

NOTE B: The Department will have available a complete list of electives at time of registration. The student's choice of electives must be approved by the Department.

## 83.5 / *Third and Fourth Years—Civil Engineering*

| 83.5.1 / THIRD YEAR | *First Term Hours* | *Second Term Hours* |
|---|---|---|
| CIV E 333 (Engineering Fluid Mechanics) | 2-0 | 3-3 |
| CIV E 341 (Elementary Soil Mechanics) | — | 3-3 |
| CIV E 351 (Geodesy and Photogrammetry) | 3-2 | — |
| CIV E 365 (Structures I) | 3-3/2 | — |
| CIV E 366 (Structures II) | — | 4-3 |
| CIV E 381 (Engineering Application of Statistics and Computer Programming) | 3-3 | — |
| CIV E 382 (Engineering Applications of Differential Equations) | — | 4-0 |
| ECON 303 (Principles of Economics) | 2-0 | 2-0 |
| GEOL 330 (Engineering Geology II) | 3-3 | — |
| Total hours per week | 16-9½ | 16-9 |

| 83.5.2 / FOURTH YEAR | | |
|---|---|---|
| *Required Courses* | | |
| CIV E 405 (Project Management) | — | 3-3/2 |
| CIV E 414 (Highway Engineering) | 3-0 | — |
| CIV E 423 (Water Supply and Waste Disposal) | 3-3/2 | — |
| CIV E 436 (Hydrology) | 3-3/2 | — |
| CIV E 442 (Foundations and Earth Structures) | 3-3 | — |
| CIV E 456 (Concrete and Asphalt Technology) | — | 3-3 |
| CIV E 459 (Practical Experience or Project) | — | — |
| CIV E 467 (Structures III) | 3-3 | — |
| ENG P 459 (Practice of Engineering Profession) | — | 1-0 |
| Group (1) elective | — | 3-0 |
| Group (2) elective | — | 3-3 |
| Group (3) elective | — | 3-0 |
| Total hours per week | 15-9 | 16-7½ |
| *Electives, Group (1)* | | |
| CIV E 415 (Transportation and Planning Operations) | — | 3-0 |
| CIV E 437 (Hydraulic Engineering) | — | 3-0 |
| CIV E 443 (Field Problems in Soil Mechanics) | — | 3-0 |
| CIV E 468 (Structural Analysis) | — | 3-0 |

| | First Term Hours | Second Term Hours |
|---|---|---|
| *Electives, Group (2)* | | |
| CIV E 424 (Environmental Design) | — | 3-3 |
| CIV E 438 (Theoretical Fluid Mechanics) | — | 3-3 |
| CIV E 469 (Structural Design) | — | 3-3 |
| GEOL 466 (Glacial Geology) | — | 3-3 |
| *Electives, Group (3)* | | |
| CIV E 483 (Civil Engineering Analysis) | — | 3-0 |
| LAW 300 (Law for Engineers) | — | 3-0 |

NOTE: Students may select other technical or non-technical electives of equivalent time in consultation with the Department.

## 83.6 / *Third and Fourth Years—Electrical Engineering*

| 83.6.1 / THIRD YEAR | First Term Hours | Second Term Hours |
|---|---|---|
| *Required Courses* | | |
| E E 315 (Electromagnetic Theory I) | 2-2/2s | 2-2/2s |
| E E 320 (Analytical Methods of Electrical Engineering) | 2-2/2s | 2-2/2s |
| E E 332 (Electromechanical Energy Conversion) | 2-0 | 2-0 |
| MATH 408 (Complex Variables) | 3-0 | — |
| MATH 412 (Linear Algebra II) | — | 3-0 |
| Subtotal hours per week | 9-2*s* | 9-2s |
| *Additional Courses—Pattern I* | | |
| E E 351 (Network Theory I: Analysis) | 2-0 | 2-0 |
| E E 358 (Electrical Laboratories) | 0-6 | 0-6 |
| E E 371 (Electronics I) | 2-0 | 2-0 |
| MECH 5 371 (Transport Processes) | 2-1s | 2-1s |
| Subtotal hours per week | 6-7 | 6-7 |
| Total hours per week for Pattern I | 15-9 | 15-9 |
| *Additional Courses—Pattern II* | | |
| E E 359 (Electrical Laboratories) | 0-4 | 0-4 |
| E E 360 (Electronics and Circuits) | 3-0 | 3-0 |
| MATH 430 (Advanced Mechanics) | 3-0 | 3-0 |
| PHYSICS 474 (Relativity and Introduction to Wave Mechanics) | 2-0 | 2-0 |
| Subtotal hours per week | 8-6 | 8-6 |
| Total hours per week for Pattern II | 17-8 | 17-8 |

NOTE: Students who wish to take Pattern II must have a high standing in Mathematics and Physics and normally will be required to have a grade-point average of approximately 7 in their second year. The head of the Electrical Engineering Department may make an exception to this rule if he considers that a student is otherwise qualified. This pattern is intended to provide the student with a thorough background in Mathematics and Physics and is designed for those who wish to pursue a program of advanced study and research in areas of Electrical Engineering which require such a background.

| 83.6.2 / FOURTH YEAR | First Term Hours | Second Term Hours |
|---|---|---|
| *Required Courses* | | |
| ENG P 459 (The Practice of the Engineering Profession) | — | 1-0 |
| E E 461 (Control Systems) | 3-0 | 3-0 |
| E E 471 (Electronics II) | 2-2/2s | 2-2/2s |
| E E 492 (Electromagnetic Theory II) | 2-0 | 2-0 |
| Subtotal hours per week | 7-1 | 8-1 |
| *Additional Courses, Pattern I* | | |
| E E 458 (Electrical Laboratories) | 0-9 | 0-9 |
| PHYS 530 (Modern Physics) | 2-0 | 2-0 |
| At least four elective one-term courses or equivalent | 2x3-0 | 2x3-0 |
| Subtotal hours per week | 8-9 | 8-9 |
| Total hours per week for Pattern I | 15-10 | 16-10 |

NOTE: All students electing to take Pattern I in their fourth year must obtain credit in Economics 304 or an approved equivalent before graduation.

| *Additional Courses, Pattern II* | | |
|---|---|---|
| E E 459 (Electrical Laboratories) | 0-5 | 0-5 |
| MATH 421 (Boundary Value Problems) | 3-0 | 3-0 |
| MATH 451 (Analysis) | 2-0 | 2-0 |
| PHYS 510 (Statistical Physics) | 3-0 | 3-0 |
| Minimum of two elective one-term courses or equivalent | 3-0 | 3-0 |
| Subtotal hours per week | 11-5 | 11-5 |
| Total hours per week for Pattern II | 18-6 | 19-6 |
| *Elective Courses* | | |
| BUS 250 (Business Principles) | 3-0 | 3-0 |
| B LAW 310 (Business Law) | 3-0 | 3-0 |
| CMPUT 458 (Numerical Analysis) | — | 3-0 |
| ECON 200 (Principles of Economics) | 3-0 | 3-0 |
| E E 401 (Electrical Design) | 3-0 | — |
| E E 407 (High Voltage Engineering) | — | 3-0 |
| E E 421 (Electrical Power Transmission) | 3-0 | — |
| E E 425 (Power Systems) | — | 3-0 |
| E E 431 (Electrical Machinery) | 3-0 | — |
| E E 433 (Electrical Energy Sources) | 3-0 | — |
| E E 441 (High Vacuum Technology) | — | 3-0 |
| E E 445 (Electrical Instruments and Relays) | — | 3-0 |
| E E 450 (Network Theory II—Synthesis) | 3-0 | — |
| E E 472 (Physical Electronics) | — | 3-0 |
| E E 475 (Generation of High Frequencies) | 3-0 | — |
| E E 477 (Pulse and Waveshaping Circuits) | — | 3-0 |
| E E 479 (Switching Circuits and Logical Design) | 3-0 | — |
| E E 483 (Introduction to the Physics of Plasmas) | 3-0 | — |
| E E 485 (Acoustics) | — | 3-0 |
| E E 487 (Principles of Communication Theory) | — | 3-0 |
| E E 495 (Radiation, Antennas and Propagation) | — | 3-0 |
| E E 496 (Introduction to Principles and Physics of Lasers) | 3-0 | — |
| E E 497 (Microwave Measurements) | — | 3-0 |
| E E 498 (Special Problems I) | 3-0 | — |
| E E 499 (Special Problems II) | — | 3-0 |

| | First Term Hours | Second Term Hours |
|---|---|---|
| I R 302 (Industrial Relations) | 2-0 | 2-0 |
| LAW 300 (Commercial Law for Engineers) | — | 3-0 |
| MARK 302 (Fundamentals of Marketing) | 2-0 | 2-0 |
| MECH E 490 (Power Plant Engineering) | 3-0 | — |
| PROD 310 (Production Management) | 3-0 | 3-0 |
| STAT 305 (Introductory Statistics) (See Note A) | — | 3-2 |
| STAT 450 (Probability and Statistics) (See Note A) | 3-0 | 3-0 |

NOTE A: Only one of the two Statistics courses may be chosen.

NOTE B: Electives outside this list may be selected in consultation with the head of the Department of Electrical Engineering.

## 83.7 / *Third and Fourth Years—Mechanical Engineering*

### 83.7.1 / THIRD YEAR

| | First Term Hours | Second Term Hours |
|---|---|---|
| *Required Courses* | | |
| MEC E 302 (Mechanical Measurements) | 2-3 | — |
| MEC E 330 (Fluid Mechanics) | 3-2 | — |
| MEC E 340 (Applied Thermodynamics) | 3-0 | — |
| MEC E 361 (Machine Components) | — | 2-3/2 |
| MEC E 362 (Mechanics of Machines) | 2-3/2 | — |
| MEC E 380 (Advanced Strength of Materials I) | — | 3-0 |
| MATH 415 (Partial Differential Equations) | 3-0 | 3-0 |
| E E 305 (Fundamentals of Electrical Engineering) | — | 3-3/2 |
| MET E 362 (Physical Metallurgy) | — | 3-3 |
| STAT 335 (Probability, Statistics, and Programming) | 3-2 | — |
| ECON 304 (Principles of Economics) (Notes A, B) | 3-0 | or 3-0 |
| Total hours per week (Note D) | 16-6½ | 17-6 |
| *Electives—Full Courses* | | |
| BUS 300 (Administrative Principles) | 3-0 | 3-0 |
| BUS 302 (Organizational Behavior) | 2-0 | 2-0 |
| E E 315 (Electromagnetic Theory I) (Note C) | 2-2/2s | 2-2/2s |
| PHYS 400 (Development of Modern Physics) (Note C) | 3-3 | 3-3 |
| PHYS 416 (Wave Mechanics and Theory of Solids) (Note C) | 2-0 | 2-0 |
| PHYS 482 (Electromagnetism) (Note C) | 3-0 | 3-0 |
| PHYSL 361 (Elementary Human Physiology) (Note C) | 3-0 | 3-0 |
| *Electives—Half-courses* | | |
| AG ENG 342 (Work Study) | — | 3-0 |
| ANTHR 330 (Culture and Technology) | — | 3-0 |
| BUS 308 (Business Statistics) | — | 3-3 |
| BUS 310 (Commercial Law) | 3-0 | — |
| CMPUT 458 (Numerical Analysis) | — | 3-0 |
| MEC E 352 (Rigid Body Dynamics in Three Dimensions) | — | 3-0 |
| PHIL 301 (Philosophical Thinking) | — | 3-0 |

NOTE A: A student who has prior credit in this course must replace it with a free elective.

NOTE B: Economics 304 may be taken in either term depending on the choice of free elective.

NOTE C: Only students with a grade-point average of 6.0 or better and consent of the Department will be permitted to take these courses.

NOTE D: Hours are approximate depending on the choice of elective. Owing to possible timetable difficulties the Department cannot guarantee that all electives will be available.

### 83.7.2 / FOURTH YEAR

| | First Term Hours | Second Term Hours |
|---|---|---|
| *Required Courses* | | |
| MEC E 452 (Mechanical Vibrations) | 3-0 | — |
| MEC E 480 (Advanced Strength of Materials II) | — | 3-0 |
| MEC E 401 (Mechanical Engineering Laboratory) | 0-3 | 0-3 |
| MEC E 436 (Aerodynamics of Compressible Flow) | — | 3-0 |
| MEC E 462 (Principles of Design) | 3-2 | — |
| MEC E 463 (Design Project) | — | 0-3 |
| MEC E 470 (Heat Transfer I) | 3-0 | — |
| E E 469 (Feed Back Control Systems) | — | 3-3/2 |
| ENG P 459 (Practice of Engineering Profession) | — | 1-0 |
| Elective courses | 6-0 | 6-0 |
| Total hours per week | 15-5 | 16-7½ |
| *Electives—Full Courses* | | |
| BUS 300 (Administrative Principles) | 3-0 | 3-0 |
| BUS 302 (Organizational Behavior) | 2-0 | 2-0 |
| ECON 200 (Principles of Economics) | 3-0 | 3-0 |
| MATH 421 (Boundary Value Problems) | 3-0 | 3-0 |
| MATH 430 (Advanced Mechanics) | 3-0 | 3-0 |
| PHYSL 361 (Elementary Human Physiology) | 3-0 | 3-0 |
| *Electives—Half-courses* | | |
| BIOL 445 (Cell Physiology) (Note B) | — | 3-3 |
| BUS 308 (Introductory Business Statistics) | — | 3-3 |
| BUS 310 (Commercial Law) | 3-0 | — |
| BUS 312 (Government and Business) | — | 3-0 |
| C E 434 (Water Power Engineering) | — | 3-3 |
| CMPUT 458 (Numerical Analysis and Computer Methods) (Note B) | — | 3-0 |
| FIN 304 (Business Finance) | 3-0 | or 3-0 |
| IN REL 304 (Industrial Relations) | 3-0 | or 3-0 |
| LAW 300 (Law for Engineers) | — | 3-0 |
| MARK 304 (Fundamentals of Marketing) | 3-0 | or 3-0 |
| MATH 408 (Functions of a Complex Variable) | 3-0 | — |
| MATH 480 (Matrices and Cartesian Tensors) | 3-0 | — |
| MEC E 352 (Rigid Body Dynamics in Three Dimensions) | — | 3-0 |
| MEC E 440 (Energy Conversion) | — | 3-0 |
| MEC E 445 (Analytical Thermodynamics) | 3-0 | — |
| MEC E 471 (Heat Transfer II) | — | 3-0 |

| | First Term Hours | Second Term Hours |
|---|---|---|
| MEC E 485 (Mechanics of Solids) (Note B) | — | 3-0 |
| MEC E 490 (Power Plant Engineering) | 3-0 | — |
| PET E 432 (Reservoir Mechanics I) | 3-3/2 | — |
| PET E 434 (Reservoir Mechanics II) (Note B) | — | 3-3/2 |
| PHYSL 401 (Special Mammalian Physiology) (Note B) | — | 3-3 |
| PROD 304 (Fundamentals of Production) | 3-0 or 3-0 | |

NOTE A: The student is required to select the equivalent of two full courses as electives to complete his program. These may be selected from the lists above. In consultation with the Department other suitable courses may be substituted for those shown. Owing to possible timetable difficulties the Department cannot guarantee that every course shown will be available. Students are cautioned that only those with high standing in Mathematics will be permitted to select some of these options.

NOTE B: These courses cannot be taken without the appropriate prerequisites.

## 83.8 / *Third and Fourth Years—Metallurgy*

| 83.8.1 / THIRD YEAR | First Term Hours | Second Term Hours |
|---|---|---|
| C E 381 (Engineering Application of Statistics and Computer Programming) | 3-3 | — |
| C E 382 (Engineering Applications of Differential Equations) | — | 4-0 |
| CH E 312 (Fluid Mechanics) | 3-1 | — |
| CH E 314 (Heat Transfer) | — | 3-1 |
| GEOL 414 (Mineralogy) | 3-3 | — |
| CHEM 370 (Physical Chemistry) | 3-3 | 3-3 |
| MET E 355 (Process Metallurgy I) | 3-3 | — |
| MET E 356 (Metallurgical Thermodynamics and Kinetics) | — | 3-0 |
| MET E 370 (Fundamentals of Physical Metallurgy I) | — | 3-3 |
| Total hours per week | 15-13 | 16-7 |

| 83.8.2 / FOURTH YEAR | | |
|---|---|---|
| CHEM 432 (Inorganic Chemistry) | 3-0 | 3-0 |
| ENG P 459 (Practice of the Engineering Profession) | — | 1-0 |
| E E 303 (Electronic Instrumentation) | 2-3/2 | — |
| PHYS 416 (Introduction to Wave Mechanics) | 2-0 | 2-0 |
| MET E 404 (Practical Experience) | — | — |
| MET E 455 (Process Metallurgy II) | 3-3/2 | — |
| MET E 456 (Process Metallurgy III) | — | 3-3/2 |
| MET E 461 (Applications of Physical Metallurgy) | 3-0 | 3-3 |
| MET E 465 (Research Project) | 0-3 | 0-6 |
| MET E 470 (Fundamentals of Physical Metallurgy II) | 3-3 | — |
| MET E 490 (Colloquium) | — | 0-1 |
| Elective (See Note) | — | 3-0 |
| Total hours per week | 16-9 | 15-11½ |

NOTE: Elective to be chosen in consultation with Department—approximately equivalent time will be accepted, according to course.

## 83.9 / *Third and Fourth Years—Mining*

| 83.9.1 / THIRD YEAR | First Term Hours | Second Term Hours |
|---|---|---|
| C E 381 (Engineering Statistics Computer Programming) | 3-3 | — |
| C E 382 (Engineering Applications of Differential Equations) | — | 4-0 |
| ECON 303 (Principles of Economics) | 2-0 | 2-0 |
| CH E 312 (Fluid Mechanics) | 3-1 | — |
| CH E 314 (Heat Transfer) | — | 3-1 |
| GEOL 414 (Mineralogy) | 3-3 | — |
| MET E 355 (Process Metallurgy I) | 3-3 | — |
| MET E 356 (Metallurgical Thermodynamics and Kinetics) | — | 3-0 |
| MET E 362 (Physical Metallurgy) | — | 3-3 |
| M E 303 (Introduction to Mining) | 2-3/2 | — |
| M E 304 (Rock Mechanics and Explosives) | — | 2-0 |
| Total hours per week | 16-11½ | 17-4 |

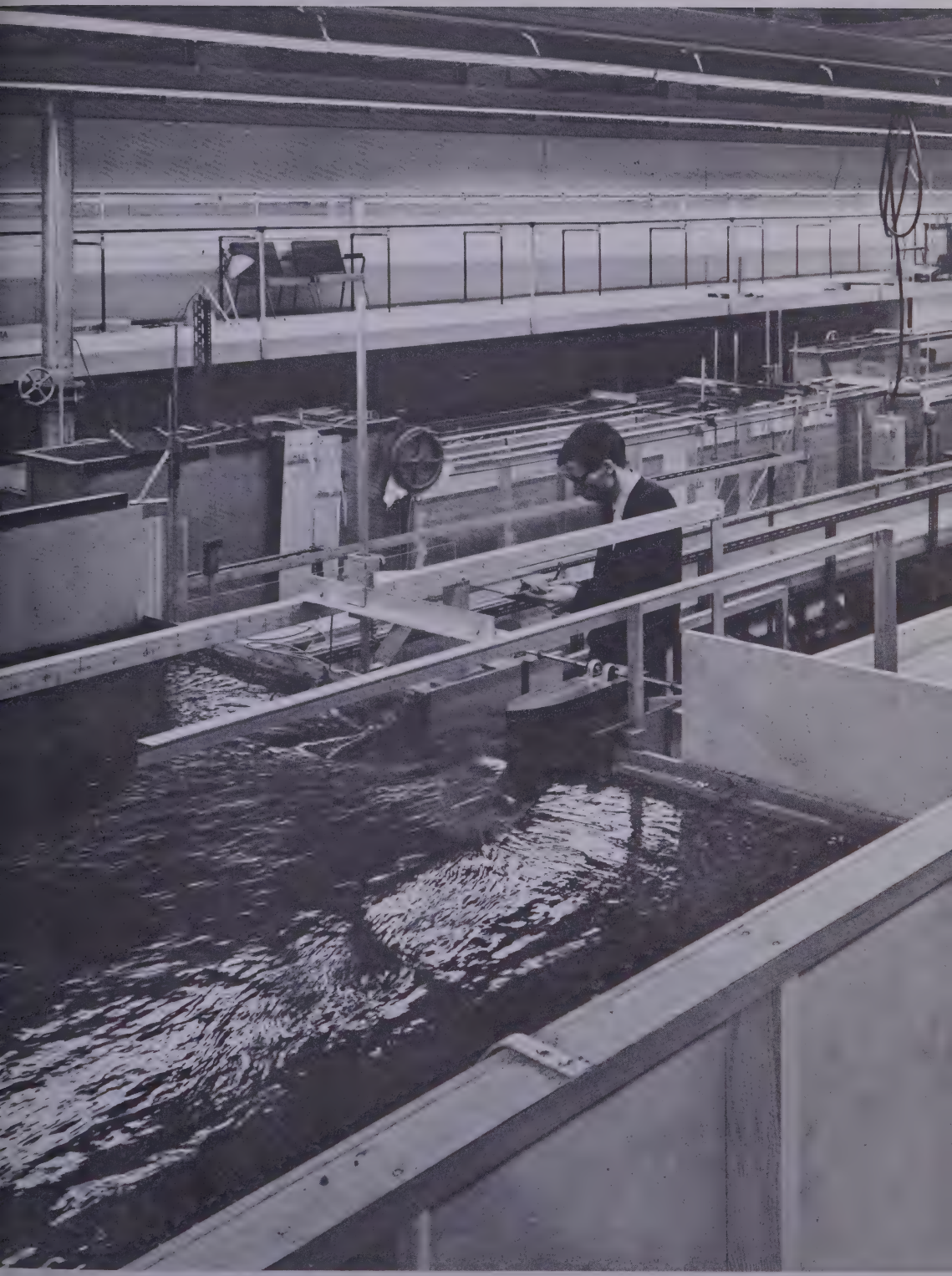
| 83.9.2 / FOURTH YEAR | | |
|---|---|---|
| C E 365 (Structures I) | 3-3/2 | — |
| ENG P 459 (Practice of the Engineering Profession) | — | 1-0 |
| GEOL 450 (Petrology) | 1-3 | — |
| GEOL 460 (Metallic Mineral Deposits) | — | 3-3 |
| GEOL 340 (Structural Geology) | — | 3-3 |
| MET E 455 (Process Metallurgy II) | 3-3/2 | — |
| MET E 456 (Process Metallurgy III) | — | 3-3/2 |
| M E 400 (Mining Methods) | 3-0 | 3-0 |
| M E 401 (Mine Design) | 0-3 | 0-6 |
| M E 404 (Practical Experience) | — | — |
| M E 411 (Rock Mechanics Laboratory) | 0-3 | — |
| E E 303 (Electronic Instrumentation) | 2-3/2 | — |
| Elective (See Note B)) | 3-0 | 3-0 |
| Total hours per week | 15-13½ | 16-13½ |

NOTE A: With the approval of the Department suitable Geology courses may be substituted for some of the courses above.

NOTE B: Elective to be chosen in consultation with Department—approximately equivalent time will be accepted, according to course.

## 83.10 / *Specialization in Petroleum Engineering, Third and Fourth Years*

Two courses in Petroleum Reservoir Mechanics are available to students in the senior years of the programs in Chemical and Mechanical Engineering, to enable them



*Hydraulic model of the Brazeau hydro-electric power plant, showing the spillway which will be installed as the second stage of the plant.*

to prepare for careers in the petroleum production industry. At the graduate level, programs in Petroleum Engineering leading to the degrees of M.Sc. or Ph.D. are open to students who have graduated with the B.Sc. degree in any branch of Engineering.

## 83.11 / *Graduate Study*

The University of Alberta offers the degrees of Master of Engineering, Master of Science, and Doctor of Philosophy in many fields of Engineering. Details of these programs are given in the Graduate Studies section of the Calendar.

# 84 / DETAILS OF COURSES

## 84.1 / *General Information*

Courses offered by the Faculty of Engineering are listed here in alphabetical order; courses open to Engineering students but offered by other faculties are listed separately in § 84.11.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Following the title of the course is the symbol "♦" standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages. An ordinary full-year course is weighted 6. A half-course is normally weighted 3. Some honors and graduate courses involving research may vary in weight according to the length and difficulty of the research project. Some courses are offered for credit only, and carry no weight.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours, respectively, required by the course in a week. When they appear, the symbol "S" denotes seminar hours and the symbol "L" denotes combined lecture-laboratory hours. The expression "3/2" means three hours of instruction every second week. The hours of instruction for a full course are the same in both terms unless otherwise indicated. If the course is a half-course, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 84.2 / *Chemical Engineering*

Department of Chemical and Petroleum Engineering

CH E 224. *Engineering Thermodynamics I.* ♦3 (Second Term, 3-1s). An introduction to the first and second law of thermodynamics. Text: Van Wylen & Sonntag, *Fundamentals of Classical Thermodynamics.*

CH E 254. *Engineering Design.* ♦3 (Second Term, 3-3s). The solution of engineering problems; design as a decision making process; introduction to computer in handling engineering problems.

CH E 312. *Fluid Mechanics.* ♦3 (First Term, 3-1s). Newtonian and non-Newtonian fluid behavior; laminar, turbulent, and compressible flow. Text: Bird, Stewart, & Lightfoot, *Transport Phenomena.*

CH E 314. *Heat Transfer.* ♦3 (Second Term, 3-1s). Conduction; thermal radiation; natural and forced convection; evaporation; macroscopic energy balances. Text: Bird, Stewart, & Lightfoot, *Transport Phenomena.*

CH E 324. *Engineering Thermodynamics II.* ♦4 (Second Term, 4-1s). The thermodynamics of non-ideal gases and liquids; vapor-liquid equilibrium, and thermodynamcis of chemical processes.

CH E 353. *Chemical Engineering Laboratory I.* ♦2 (Second Term, 1-4/2). Experiments in fluid mechanics, heat transfer, and thermodynamics.

CH E 354. *Process Analysis.* ♦3 (Second Term, 2-2s). Steady and unsteady state material and energy balances; feasibility and profitability studies.

CH E 374. *Mathematical Applications.* ♦3 (Second Term, 3-0). Numerical methods; optimization; and linear programming.

CH E 410. *Mass Transfer.* ♦4 (First Term, 4-2s). Equilibrium stage processes and mass transfer rate processes. Text: Treybal, *Mass Transfer Operation.*

CH E 434. *Applied Reaction Kinetics.* ♦3 (Second Term, 3-1s). Kinetics of homogeneous and heterogeneous chemical reactions; design of chemical reactors and related equipment. Text: Levenspiel, *Chemical Reaction Engineering.*

CH E 442. *Process Dynamics.* ♦3 (First Term, 3-3/2). Process models and simulation; transient behavior and dynamic testing. Texts: Coughanowr & Koppel, *Process Systems Analysis and Control*; Buckley, *Techniques of Process Control.*

CH E 444. *Process Control.* ♦3 (Second Term, 3-3/2). Linear and non-linear analysis; process equipment control schemes; sampled data and computer control. Texts: Coughanowr & Koppel, *Process Systems Analysis and Control;* Buckley, *Techniques of Process Control.*

CH E 446. *Process Dynamics and Control.* ♦3 (First Term, 3-0). Control applications; process transfer functions; transient response; stability criteria; real time data acquisition and computer control.

CH E 453. *Chemical Engineering Laboratory II.* ♦4 (1-4/2). Experimental work in thermodynamics, unit operations, process control and applied reaction kinetics.

CH E 454. *Operations Analysis.* ♦3 (First Term, 3-1s). Economic evaluation of large scale processing systems; forecasting; allocation of resources; inventory control; and replacements.

CH E 455. *Chemical Engineering Design Project.* ♦4 (2-2s; 1-4s). Integration of chemical engineering practice and theory in the design of a processing plant.

CH E 474. *Optimization Methods.* ♦3 (Second Term, 3-1s). Search for optimum conditions by Lagrangian multipliers and mathematical programming, gradient methods, and dynamic programming.

CH E 476. *Mathematical Applications.* ♦3 (First Term, 3-0). Ordinary and partial differential equations; series solutions; complex numbers; and integral transforms.

CH E 478. *Statistical Methods in Chemical Engineering.* ♦3 (Second Term, 3-1s). Statistical methods in the analysis of research, development, and production problems.

CH E 482. *Colloquium.* ♦1 (0-1s). Discussion of topics from recent technical literature.

CH E 484. *Industrial Tour.* Periodic visits to industrial plants, laboratories, and field installations.

## 84.3 / *Civil Engineering*

### 84.3.1 / UNDERGRADUATE COURSES

CIV E 251. *Theory and Practice of Plane Surveying.* ♦2 (Second Term, 2-2). Surveying instruments; measurements and measurement errors. Field surveying; electronic distance measurements; computations and computer reduction of data. Instructor: Bigg.

CIV E 252. *Survey School.* ♦5 (Three weeks at end of Second Term). Practical exercises in field methods, project type assignments. Field astronomy; electronic distance measuring instruments. Note: Survey school is held off campus. Instructors: Bigg and staff.

CIV 5 263. *Mechanics of Deformable Bodies I.* ♦4 (First Term, 3-3). Plane stress and strain; stress-strain relationships. Stresses and deformations resulting from axial and transverse loads. Buckling of columns. Torsion of circular sections. Combined stress and statically indeterminate problems. Laboratory to demonstrate mechanical properties and verify assumptions of analysis. Instructors: Simmonds and staff.

CIV E 264. *Mechanics of Deformable Bodies II.* ♦2 (Second Term, 2-0). Stress and strain; strain energy; theories of failure. Shear flow; shear centre. Stress concentrations; fatigue; impact; visco-elastic and post-yield behavior. Instructors: Murray and Simmonds.

CIV E 333. *Engineering Fluid Mechanics.* ♦6 (First Term, 2-0; Second Term, 3-3). Fundamental principles; closed conduit flow; gas dynamics; rotodynamic machines; open channel flow; unsteady flow. Laboratory program to illustrate lecture material. Instructor: Rajaratnam.

CIV E 341. *Elementary Soil Mechanics.* ♦4 (Second Term, 3-3). Weight-volume relationships; identification and description of soils; index properties; soil classification; soil structure; permeability; neutral and effective stresses; theory of consolidation; introduction to strength of soils. Laboratory testing to illustrate lecture material.

CIV E 351. *Geodesy and Photogrammetry.* ♦4 (First Term, 3-2). Geodesy; cartography; legal survey systems. Photogrammetry; photographic interpretation. Application in laboratory.

CIV E 365. *Structures I.* ♦4 (First Term, 3-3/2). Integrated treatment of analysis and design of tension members, connections, and simple flexural members; for steel, timber and reinforced concrete. Instructor: MacGregor.

CIV E 366. *Structures II.* ♦5 (Second Term, 4-3). Integrated treatment of analysis and design of trusses, continuous flexural members and axially loaded columns; for steel, timber, and reinforced concrete. Instructors: Adams and Murray.

CIV E 381. *Engineering Applications of Statistics and Computer Programming.* ♦4 (First Term, 3-3). Principles of statistics; significance tests; regression analysis. Fortran programming. Laboratory exercises on the computer. Instructors: Simmonds and Warwaruk.

CIV E 382. *Engineering Applications of Differential Equations.* ♦4 (Second Term, 4-0). Ordinary differential equations. Power series; Fourier series; Laplace transforms. Partial differential equations; complex variables; vector analysis. Engineering applications. Instructor: Murray.

CIV E 405. *Project Management.* ♦4 (Second Term, 3-3/2). Planning and scheduling; theories and techniques of project management. Instructors: Fowler and staff.

CIV E 414. *Highway Engineering.* ♦3 (First Term, 3-0). Traffic planning; highway economics; geometric design. Earth work; compaction; frost action; pavement design; stabilization; construction and maintenance. Instructors: Bakker and Anderson.

CIV E 415. *Transportation and Planning Operations.* ♦3 (Second Term, 3-0). Traffic capacity; traffic planning and control; street geometrics; parking studies and design. Urban transportation alternatives. Instructor: Bakker.

CIV E 423. *Water Supply and Waste Disposal.* ♦4 (First Term, 3-3/2). Domestic and industrial water requirements; water quality, purification and treatment; hydraulics and design of distribution systems; storage requirements. Storm drain, separate and combined sewer design; sewage treatment. Stream pollution, public health and conservation. Instructor: Bouthillier.

CIV E 424. *Environmental Design.* ♦4 (Second Term, 3-3). Historical growth and development of cities; population studies; land use and planning; design of residential, commercial and industrial areas; effects of wastes on our environment. Assessment and control of air pollution. Laboratory tests for pollution levels and treatment methods; subdivision design. Instructors: Bakker and Bouthillier.

CIV E 426. *Town Planning I.* ♦2 (First Term, 2-1s). Historical growth and development of cities; growth and decay; population studies; urban land economics; land use and planning; parks and playgrounds; public services.

CIV E 427. *Town Planning II.* ♦2 (Second Term, 2-1s). Planning legislation; regional and city planning; zoning; subdivision design; commercial areas; downtown planning.

CIV E 436. *Hydrology.* ♦4 (First Term, 3-3/2). Water occurrence in nature and its relation to hydraulic engineering. Frequency analysis, unit-graph methods, flood routing, other studies. River behavior; man's interference with rivers. Instructor: Verschuren.

CIV E 437. *Hydraulic Engineering.* ♦3 (Second Term, 3-0). Open channel flow; design of hydraulic structures. Pump and turbine characteristics. Transient flow; sediment transport; hydraulic models. Instructor: Nuttall.

CIV E 438. *Theoretical Fluid Mechanics.* ♦4 (Second Term, 3-3). Navier-Stokes equation; laminar and turbulent boundary layers; turbulent pipe flow; free turbulent flow; dimensional analysis; Instructor: Rajaratnam.

CIV E 442. *Foundations and Earth Structures.* ♦4 (First Term, 3-3). Plastic and elastic equilibrium; earth pressure. Design of shallow and deep foundations; retaining structures; earth dams and embankments; slope stability. Instructor: Sinclair.

CIV E 443. *Field Problems in Soil Mechanics.* ♦3 (Second Term, 3-0). Field measurements and observations; analysis of soil masses. Design of retaining walls, bulkheads and cofferdams. Foundations in permafrost areas. Subsurface exploration and sampling. Properties of the clay fraction.

CIV E 456. *Concrete and Asphalt Technology.* ♦4 (Second Term, 3-3). Properties of portland cement concrete related to "micro" and "macro" structure and constituent materials. Properties and design of bituminous mixes. Epoxy compounds. Instructors: Anderson and Fowler.

CIV E 459. *Practical Experience or Project Assignment.* ♦0 (no designated time). Formal report required of all fourth year civil engineering students. Instructor: Bouthillier.

CIV E 467. *Structures III.* ♦4 (First Term, 3-3). Design of column footings, slab systems, beam columns and eccentric connections. Elastic and plastic analysis of frames. Instructor: Longworth.

CIV E 468. *Structural Analysis.* ♦3 (Second Term, 3-0). Numerical analysis of beams and columns. Matrix methods. Dynamic response. Instructor: Warwaruk.

CIV E 469. *Structural Design.* ♦4 (Second Term, 3-3). Special topics; plate girders; beam columns; two-way slab systems.

CIV E 483. *Civil Engineering Analysis.* ♦3 (Second Term, 3-0). Formulation, classification and solution of various types of equations arising in civil engineering problems.

## 84.3.2 / GRADUATE COURSES

CIV E 500. *Civil Engineering Project.* ♦0 (no set hours, credit equivalent to a one-term course).

CIV E 510. *Pavement Design.* ♦3 (First term, 3-0).

CIV E 511. *Highway Materials.* ♦3 (Second Term, 2-2).

CIV E 512. *Transportation Design.* ♦3 (First Term, 3-0).

CIV E 513. *Transportation Systems Analysis.* ♦3 (Second Term, 3-0).

CIV E 514. *Transportation Engineering.* ♦3 (First or Second Term, 3-0).

CIV E 522. *Water and Waste Treatment.* ♦3 (Second Term, 2-4).

CIV E 523. *Sanitary Engineering I.* ♦3 (First Term, 3-0).

CIV E 524. *Sanitary Engineering II.* ♦3 (Second Term, 3-0).

CIV E 528. *Advanced Fluid Mechanics I.* ♦3 (First Term, 3-0).

CIV E 529. *Advanced Fluid Mechanics II.* ♦3 (Second Term, 3-0).

CIV E 531. *Engineering Aspects of Ground Water Hydrology.* ♦3 (First Term, 3-0).

CIV E 532. *Surface Water Hydrology.* ♦3 (Second Term, 3-0).

CIV E 533. *River Engineering I.* ♦3 (Second Term, 3-0).

CIV E 534. *River Engineering II.* ♦3 (First or Second Term, 3-0).

CIV E 535. *Open Channel Flow I.* ♦3 (First Term, 3-0).

CIV E 536. *Open Channel Flow II.* ♦3 (Second Term, 3-0).

CIV E 537. *Sediment Transport.* ♦3 (First Term, 3-0).

CIV E 538. *Advanced Topics in Fluid Mechanics.* ♦3 (either term, 3-0).

CIV E 539. *Hydraulics of Earth Dams and Related Structures.* ♦3 (First Term, 2-2).

CIV E 540. *Soil Mechanics and Foundations.* ♦6 (3-0).

CIV E 542. *Advanced Soil Mechanics Problems.* ♦3 (Second Term, 3-0).

CIV E 543. *Foundation Engineering.* ♦3 (First Term, 3-0).

CIV E 544. *Earth and Rock-Fill Dams.* ♦3 (First Term, 3-0).

CIV E 545. *Classification and Control Testing of Soils.* ♦3 (First Term, 2-3).

CIV E 546. *Strength and Volume Characteristics of Soils.* ♦3 (Second Term, 2-3).

CIV E 548. *Advanced Topics in Soil Mechanics.* ♦3 (either term, 3-0).

CIV E 550. *Dimensional Analysis and its Application in Civil Engineering.* ♦3 (First Term, 3-0).

CIV E 555. *Cement and Concrete Technology.* ♦3 (either term, 3-0).

CIV E 561. *Plastic Analysis and Design of Structures.* ♦3 (First Term, 3-0).

CIV E 562. *Behavior and Design of Steel Structures.* ♦3 (Second Term, 3-0).

CIV E 563. *Behavior and Design for Reinforced Concrete Members.* ♦3 (First Term, 3-0).

CIV E 564. *Behavior and Design of Reinforced Concrete Structures.* ♦3 (Second Term, 3-0).

CIV E 565. *Behavior and Design of Prestressed Concrete Structures.* ♦3 (Second Term, 3-0).

CIV E 566. *Behavior of Structural Members and Frames.* ♦3 (Second Term, 3-0).

CIV E 568. *Advanced Topics in Structural Engineering.* ♦3 (either term, 3-0).

CIV E 569. *Structural Analysis and Design.* ♦3 (Second Term, 3-0).

CIV E 571. *Indeterminate Structural Analysis.* ♦3 (First Term, 3-0).

CIV E 572. *Advanced Structural Analysis.* ♦3 (Second Term, 3-0).

CIV E 573. *Analysis and Design of Roof Shells.* ♦3 (Second Term, 3-0).

CIV E 581. *Turbulent Boundary Layers.* ♦3 (First Term, 3-0).

CIV E 582. *Turbulent Jets and Wakes.* ♦3 (Second Term, 3-0).

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## 84.4 / *Drafting and Graphics*

Department of Civil Engineering

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D G 151. *Drafting and Graphics.* ♦4 (1-3). Freehand and instrumental drawing; pictorials and multiviews; projection and revolution; geometry and practices. Instructors: Preston and staff.

## 84.5.1 / UNDERGRADUATE COURSES

E E 254. *Fundamentals of Electrical Engineering.* ♦3 (Second Term, 3-2/2). Physical concepts of resistance. inductance and capacitance. Kirchhoff's laws and circuit equations of d-c networks. Magnetic circuits. Energy concepts. Time domain analysis of R-L, R-C and R-L-C networks. Complex numbers and Phasor Algebra. Impedance concept. Power factor. Resonance. Three phase circuits. Network theorems. Measuring instruments. Vacuum tube and transistor.

E E 303. *Electronic Instrumentation* (for Mining and Metallurgy Engineers). ♦2 (First Term, 2-3/2). Fundamentals of electronics; amplification, oscillation, modulation applied to measuring instruments; methods of measuring non-electrical quantities. Use of measured quantities in control systems. The laboratory will illustrate the uses and limitations of typical instruments.

E E 305. *Fundamentals of Electrical Engineering* (for Mechanical Engineers). ♦5 (Second Term, 3-3/2). Laplace transforms and applications to networks; complex frequency; transfer functions; concept of feedback; frequency response, Bode plots; signal flow graphs; electronics; vacuum tubes and transistors; small signal analysis; amplifiers; oscillators; electronic instruments; principles of electromechanical energy conversion; introduction to transformers and rotating machines.

E E 315. *Electromagnetic Theory I.* ♦5 (2-2/2s). Vector treatment of electric and magnetic fields including a microscopic treatment of magnetic materials and dielectrics. Potential theory. Maxwell's equations, waves in homogeneous isotropic media, reflection and refraction of waves.

E E 320. *Analytical Methods of Electrical Engineering.* ♦5 (2-2/2s). Topics in applied mathematics (not covered in other courses) which are commonly used in electrical engineering. Signal representation by discrete, continuous, and generalized exponentials (Fourier series and transforms and Laplace transforms), energy spectra and correlation functions, convolution and Duhamel integrals, partial differential equation applied to transmission lines, solution by Laplace transforms in two variables, conformal mapping, numerical methods.

E E 332. *Electromechanical Energy Conversion.* ♦4 (2-0). Principles of electromechanical energy conversion, energy balance and principle of virtual displacement. Audio, impulse and power transformers, D'Alembert's principle—applications to translational and rotational electromechanical transducers. Torque and voltage in rotating energy convertors. Rotating magnetic fields. Concept of the generalized machine. Behavior of the idealized d-c machine. Commutation, metadyne, amplidyne, applications of d-c machines in control systems. Steady state and transient analysis of induction machines—single phase, two-phase, and three-phase induction motors. Synchronous machines.

E E 351. *Network Theory I Analysis.* ♦4 (2-0). Review of time domain analysis of networks. Network topology. Complex frequency plane. Laplace transform methods. Network functions. Network parameters. Frequency plots—Bode and polar. Active circuits and stability. Attenuation and filters. Signal flow graphs.

E E 358. *Electrical Laboratories.* ♦6 (0-6).

E E 359. *Electrical Laboratories.* ♦4 (0-4).

E E 360. *Electronics and Circuits.* ♦6 (3-0). Network topology, complex frequency plane, network functions, network parameters (z,y,h). Image and scattering parameters. Frequency plots. Attenuation and filters. Solid state and vacuum devices. Equivalent circuits. A.C. analysis and stability of active devices.

E E 371. *Electronics I.* ♦4 (2-0). Electron ballistics review, semi-conductor physics, 2-terminal active devices (diodes all types), rectification and filtering, 1-terminal active devices (transistor-triode), device parameters, active device networks, multi-electrode active devices. Equivalent circuits of active devices, A.C. analysis of active devices in various network configurations, high frequency characteristics and aspects of active devices and their network configurations, Bode plot for active networks, feedback in active networks, stability of active networks, voltage and current stabilizers.

E E 401. *Electrical Design.* ♦3 (First Term, 3-0). Electrical design starting from fundamental physics using engineering methods.

E E 407. *High Voltage Engineering.* ♦3 (Second Term, 3-0). High voltage phenomena on transmission lines, dielectric phenomena, A.C. testing, impulse testing and rating, grounding, circuit breaking.

E E 421. *Electrical Power Transmission.* ♦3 (First Term, 3-0). Parameters and characteristics of transmission lines, power line performance, limitations, compensation. Analysis of faults and unbalanced operation of systems, D.C. transmission, lighting and surges.

E E 425. *Power System.* ♦3 (Second Term, 3-0). Optimum scheduling of generation, load flow, digital and analog methods of analysis, stability, circuit breakers, overvoltages, tie line control and selected topics.

E E 431. *Electrical Machinery.* ♦3 (First Term, 3-0). Electrical machinery: D.C. machines, power rectifying equipment, A.C. commutator machines and a more detailed study of selected topics from E E 332.

E E 433. *Electrical Energy Sources.* ♦3 (First Term, 3-0). Sources which involve direct conversion of chemical, nuclear and solar energy into electricity by electrochemical, thermionic, thermoelectric, photoelectric, ferroelectric, magnetohydrodynamic and plasma systems.

E E 441. *High Vacuum Technology.* ♦3 (Second Term, 3-0). Gas kinetics, gas flow, pumping speed theory, system design, pumping methods and pressure measurements, fabrication and leak detection techniques, adsorption and desorption processes, vacuum deposition techniques.

E E 445. *Electrical Instruments and Relays.* ♦3 (Second Term, 3-0). A study of modern A.C. instruments, relays, and readings.

E E 450. *Network Theory II—Synthesis.* ♦3 (First Term, 3-0). Introduction to modern methods of passive network synthesis. Topics covered include energy functions, properties of network functions, positive real function, testing of positive real functions, driving point synthesis: LC RC RL and RLC. Parts of network functions and related synthesis methods, transfer function synthesis, approximation techniques.

E E 458. *Electrical Laboratories.* ♦9 (0-9). Laboratories for Program I students.

E E 459. *Electrical Laboratories.* ♦7 (0-5). Laboratories for Program II students.

E E 461. *Control Systems.* ♦6 (3-0). Properties of some elements and transfer functions, Lagrange's equations of motion, flow graphs, sensitivity concept of feedback, system performance, criteria, stability, state variables, aspects of nonlinear and sample-data systems.

E E 469. *Feedback Control Systems for Mechanical Engineers.* ♦3 (Second Term, 3-3/2). Linear models of electrical, mechanical, hydraulic and electromechanical components used in control systems. Block diagrams. Signal flow graphs. Transfer functions. Time domain analysis of control systems. Root locus diagrams. Frequency response. Stability considerations. Compensation of control systems.

E E 471. *Electronics II.* ♦5 (2-2/2s). Special devices, amplifiers (all types), operational techniques, distortion, oscillators (all types and devices), multi-stable circuits, pulse and switching and digital circuits, logic circuits, memories, 2 port network analysis applied to active devices, delay lines, modulation and demodulation circuits.

E E 472. *Physical Electronics.* ♦3 (Second Term, 3-0). Crystals, waves in crystals (band theory of solids), electronic conduction, semiconductors, semiconductor junctions and devices, superconductivity, quantum electronics.

E E 475. *Generation of High Frequencies.* ♦3 (First Term, 3-0). Triodes at high frequencies, klystrons, travelling wave tubes, magnetrons, backward wave oscillators, parametric amplifiers, and masers.

E E 477. *Pulse and Waveshaping Circuits.* ♦3 (Second Term, 3-0). Waveshaping circuits using passive elements, diodes, active devices; pulse generating circuits, mainly multivibrators and blocking oscillators; generation of linear voltage sweeps; other topics such as counting circuits, gating circuits, applications to computers, etc.

E E 479. *Switching Circuits and Logical Design.* ♦3 (First Term, 3-0). The development and interpretation of switching circuit algebra and its application in analysis and synthesis of combinational switching circuits; procedures for minimization of switching circuits and realization of switching functions using relays, tubes, solid state devices and magnetic components. Types of codes and code conversion. Sequential switching circuits and secondary assignment method.

E E 483. *Introduction to the Physics of Plasmas.* ♦3 (First Term, 3-0). Behavior of plasmas. The Debye Huckel theory. Motion of charged particles in electromagnetic fields, magnetohydrodynamics. Dynamic pinch. Two-fluid model. Plasma instabilities.

E E 485. *Acoustics.* ♦3 (Second Term, 3-0). General laws; impedance; transducers; enclosures; room acoustics; etc.

E E 487. *Principles of Communication Theory.* ♦3 (Second Term, 3-0). Designed for students interested in communication and in the presentation of data to modern signalling systems.

E E 492. *Electromagnetic Theory II.* ♦4 (2-0). Travelling and standing waves, impedance concepts. Propagation of electromagnetic waves by means of transmission lines and waveguides. Cavity resonators. Attenuation of waves due to wall and dielectric losses. Perturbation theorem. Properties of periodically loaded structures. Electromagnetic potentials and the classical theory of radiation.

E E 495. *Radiation, Antennas and Propagation.* Radiation, antenna arrays, antenna practice, aperture antennas, ground wave propagation, sky wave propagation.

E E 496. *Introduction to Principles and Physics of Lasers.* ♦3 (First Term, 3-0). Background material on radiation and atomic physics. General description and theory of lasers, solid state, fluid state and gas lasers. Variations of laser oscillations in space and time. Nonlinear phenomena. Laser applications.

E E 497. *Microwave Measurements.* ♦3 (Second Term, 3-0). Theory and techniques for the measurement of wavelength and frequency, impedance, attenuation, Q-factor, power receiver, transmitter and aerial charactreistics, properties of materials.

E E 498. *Special Problems I.* ♦3 (First Term, 3-0).

E E 499. *Special Problems II.* ♦3 (Second Term, 3-0). Courses E E 498 and 499 are intended to enable individuals or a small group of students to study topics in their particular field of interest under the supervision of a member of the Faculty.

## 84.5.2 / GRADUATE COURSES

E E 500. *Design Project.* ♦0 (time equivalent to one-term course). Detailed engineering report in the major area of interest of the student.

E E 501. *Special Topics in Electrical Engineering I.* ♦3 (First Term, 3-0). Study of special topics in the student's particular field of interest under the supervision of a member of the Faculty.

E E 502. *Special Topics in Electrical Engineering II.* ♦3 (Second Term, 3-0). Same as E E 501 except that this course number is used during the Second Term.

E E 522. *Power System Problems I.* ♦3 (First Term, 3-0). A study of selected power system topics such as stability, circuitbreaking, economic scheduling of generation, overvoltages, digital and analog approaches to analysis.

E E 523. *Power System Problems II.* ♦3 (Second Term). A continuation of E E 522 considering topics such as tie line control, excitation and its effect on the system. The application of control systems is emphasized.

E E 531. *Solid State Circuit Design.* ♦3 (First Term, 3-0). Selection of device types; biasing for linear and switching circuits; noise; linearity; stability; differential amplifiers.

E E 532. *Linear and Quasilinear Circuits.* ♦3 (Second Term, 3-0). Operational amplifier design; regulated power supplies; Class D amplifiers; active filters; power amplifiers; distortion analysis; frequency response of operational amplifiers.

E E 535. *Logical Design of Digital Computers.* ♦3 (Second Term, 3-0). A continuation of E E 479. Topics to include NAND NOR logic, digital computer memories, computer arithmetic units and control units.

E E 541. *High Vacuum Technology.* ♦3 (First Term, 3-3/2). Gas kinetics: gas flow; pumping speed theory and system design pumping methods and pressure measurement for high and ultra-high vacuum; fabrication and leak detection techniques; adsorption and desorption processes; vacuum deposition techniques; growth, structure, and properties of thin films.

E E 542. *Special Topics Using High Vacuum Technology.* ♦3 (Second Term, 3-0). Ion bombardment of solid and thin film surfaces; sputtering of thin films; growth; structure and properties of thin films; field ion microscopy.

E E 545. *Selected Laser Topics.* ♦3 (Second Term, 3-0). Design, construction and operational aspects of various types of lasers; principles of modulation and detection; transmission medium effects; optical components and concepts; information systems; noise and quantum considerations; special applications.

E E 551. *Network Synthesis I.* ♦3 (First Term, 3-0). Energy functions; positive real functions, driving point function synthesis of two element and three element one port passive networks; introduction to transfer function synthesis of passive two port networks; determination of network functions; introduction to approximation.

E E 552. *Network Synthesis II.* ♦3 (Second Term, 3-0). Transfer function synthesis of passive lossless and lossy two port networks; use of matrix factorization technique in network synthesis; approximation; time domain synthesis of passive and active networks; concepts of equivalence in network theory. Prerequisite: E E 551 or equivalent.

E E 555. *Introduction to Modern Control Theory.* ♦3 (First Term, 3-0). The control problem; linear vector spaces; linear transformations; eigen values; quadratic forms; matrix calculus; vector-matrix differential equations; state transition matrix; state-space approach to system analysis; controllability and observability of multivariable systems; introduction to Liapunov stability criterion; Z-transforms.

E E 556. *Introduction to Stochastic Processes and Nonlinear Analysis.* ♦3 (First Term, 3-0). Principles of statistics; correlation and power spectrum of stationary processes; optimum filters using mean square error criterion; introduction to nonlinear analysis.

E E 560. *Optimal Control Systems.* ♦3 (Second Term, 3-0). The optimal control problem—performance indices; use of calculus of variations in optimal control; Pontryagin's Maximum Principle (PMP); applications of PMP to time-optimal and energy-optimal control problems. Prerequisite: E E 555 or equivalent.

E E 562. *Sampled-Data Control Systems.* ♦6 (2-3). Sampling and quantizing; frequency domain analysis, z-transformation; system analysis, transient behavior and stability, compensation techniques, synthesis, digital compensation, Tsypkin's stability criterion.

E E 566. *Nonlinear Systems Theory.* ♦3 (Second Term, 3-0). Topics in nonlinear analysis; describing function methods; Liapunov stability theory; Popov stability criterion; study of nonlinear system susing functional analysis; nonlinear systems with random inputs.

E E 567. *Advanced Communication Theory.* ♦3 (3-0). Multiplexing; noise; signal to noise ratio comparisons; information theory; random signals.

E E 570. *Electromagnetic Theory.* ♦3 (First Term, 3-0). Maxwell's equations; plane waves; waveguides; resonant cavities; periodic loading; perturbation theory; radiation; the Hertz dipole; loop and linear antennae.

E E 571. *Electromagnetic Waves.* ♦3 (Second Term, 3-0). Surface waves; propagation in anisotropic media; variational methods for waveguide discontinuities; secondary sources; Bethe hole coupling theory; radiation from antennae; horns and slots; space charge waves.

E E 572. *Electron Dynamics.* ♦3 (Second Term, 3-0). Relativistic mechanics and the Lorentz transformation; the electromagnetic field tensor; Lienard-Wiechert potentials; radiation from an accelerated charge; Cherenkov radiation; radiation reaction.

E E 575. *Principles of Particle Accelerators.* ♦3 (First Term, 3-0). Phase stability; phase space concepts; periodic structures; electron and proton linacs; beam and r.f. power sources; focussing.

E E 580. *Microwave Measurements and Techniques.* ♦3 (Second Term, 2-3/2). Measurement of power, impedance, and frequency; representation and measurement of microwave circuits; resonant cavity characteristics; microwave properties of dielectrics; noise in microwave communications systems.

E E 581. *Semiconductor Microwave Electronics.* ♦3 (Second Term, 3-0). The Manley-Rowe equations. Non-linear reactance devices. Tunnel diodes and Schottky barrier diodes. Theory of operation and properties of parametric amplifiers, frequency converters, harmonic multipliers, and masers. Bulk-effect and transit-time devices.

E E 593. *Elements of Plasma Theory.* ♦3 (First Term, 3-0). The theoretical background for investigating plasmas developed from kinetic theory; topics include Saha's equation, Debye potential; Liouville's equation, the BBGKY kinetic theory, the moment equations including magnetohydrodynamic problems, the Vlasov theory with examination of plasma oscillations and Landau damping.

E E 594. *Plasma Kinetic Theory.* ♦3 (Second Term, 3-0). Topics include the adiabatic assumption; Balescu-Lenard kinetic equation; finite Larmor radius theory and quasi-linear theory.

E E 595. *Plasma Devices and Diagnostics.* ♦3 (Second Term, 3-0). Methods of obtaining plasmas: shock tubes, discharges etc. Plasma diagnostics including electric, magnetic, and optical probing of plasmas.

## 84.6 / *The Engineering Profession*

ENG P 159. *Orientation to the Engineering Profession.* ♦0 (First Term, 1-0). An outline of the development and history of the engineering profession; the branches of engineering; the work of the engineer in the various branches. Instructors: L. E. Gads and guest speakers.

ENG P 459. *The Practice of the Engineering Profession.* ♦0 (Second Term, 1-0). The role of the engineer in society; his technical and professional responsibilities—the ethics of the profession; technical and professional associations; the engineer-in-training; the engineer in industry—technical and administrative work; the consulting engineer. Instructors: R. M. Hardy and guest speakers.

## 84.7 / *Mechanical Engineering*

### 84.7.1 / UNDERGRADUATE COURSES

MEC E 152. *Engineering Mechanics.* ♦3 (First Term, 2-2s). A study of the statics of planar force systems. Instructor: J. R. Colbourne and staff.

MEC E 153. *Engineering Mechanics.* ♦2 (Second Term, 2-0). Vector algebra, statics of three dimensional systems, virtual work, moments of inertia. Instructor: J. R. Colbourne and staff.

MEC E 252. *Engineering Mechanics.* ♦3 (First Term, 3-0). Kinematics and kinetics of rigid body motion, energy and momentum methods for plane motion, impact, mechanical vibrations. Instructors: G. Ford and staff. Textbook: Beer and Johnson, *Vector Mechanics for Engineers.*

MEC E 302. *Mechanical Measurements.* ♦3 (First Term, 2-3). Characterization and behavior of typical measuring systems. Transducers and their response to steady and transient phenomena. Selected experiments in heat transfer, fluid flow, thermodynamics, vibrations, and strength of materials. Instructor: D. G. Bellow. Textbook: Beckwith and Buck, *Mechanical Measurements.*

MEC E 330. *Fluid Mechanics.* ♦4 (First Term, 3-2). Basic equations of classical hydrodynamics. Stream function, hydrostatics, vorticity, circulation, lift, irrotational flow, potential function, viscous and compressibility effects, dimensional analysis. Significances of dimensionless numbers. Instructor: C. M. Rodkiewicz. Textbook: Hansen, *Fluid Mechanics.*

MEC E 340. *Applied Thermodynamics.* ♦3 (First Term, 3-0). Thermodynamic analysis of cycles and propulsion systems applicable to engines, steam and gas turbines, elementary rockets, refrigeration, principles of combustion. Heat balance problems. Instructor: G. W. Sadler.

MEC E 352. *Three Dimensional Rigid Body Dynamics.* ♦3 (Second Term, 3-0). Kinematics and moments of inertia, D'Alembert's principle and Euler's equation of motion. Application to gyroscope problems. Instructor: J. R. Colbourne. Textbook: Kane, *Analytical Elements of Mechanics,* Vol. ii.

MEC E 361. *Machine Components.* ♦3 (Second Term, 2-3/2). Analysis and design of machine components, belts, brakes, clutches, gears, cams, springs, governors.

MEC E 362. *Mechanics of Machines.* ♦3 (First Term, 2-3/2). Velocities and accelerations in plane mechanisms. Balancing of rotating and reciprocating machinery. Gears and gear trains. Instructor: J. R. Colbourne. Textbook: Maxwell, *Kinematics and Dynamics of Machinery.*

MEC E 371. *Transport Processes.* ♦5 (2-1s). Fluid mechanics, potential and viscous flow, turbulence. Heat transfer, conduction, convection, radiation. Statistical thermodynamics. Instructor: K. C. Cheng. Textbooks: Li and Lam, *Principles of Fluid Mechanics;* Eckert and Gross, *Introduction to Heat and Mass Transfer.*

MEC E 380. *Advanced Strength of Materials I.* ♦3 (Second Term, 3-0). Review of beams and trusses, indeterminate structures, shear centre and shear flow, unsymmetrical bending, curved beams, hooks, closed rings. Instructor: G. Ford. Textbook: Seely and Smith, *Advanced Mechanics of Materials.*

MEC E 401. *Mechanical Engineering Laboratory.* ♦2 (0-3). Selected laboratory experiments in thermodynamics, heat transfer, combustion, gas dynamics and applied mechanics. Instructor: C. M. Rodkiewicz and staff.

MEC E 436. *Aerodynamics of Compressible Flow.* ♦3 (Second Term, 3-0). Subsonic wing theory, equations of motion of a crompressible perfect gas, boundary layers, one-dimensional flow in ducts and nozzles, shock waves, supersonic aerofoils. Instructor: D. J. Marsden. Textbook: Kuethe and Schetzer, *Foundations of Aerodynamics.*

MEC E 440. *Energy Conversion.* ♦3 (Second Term, 3-0). Physical basis of devices for direct energy conversion. Thermodynamic analysis, design and application of thermionic, magnetohydrodynamic, thermoelectric, solar cell, and fuel cell devices. Instructor: G. S. H. Lock. Textbook: Angrist, *Direct Energy Conversion.*

MEC E 445. *Analytical Thermodynamics.* ♦3 (First Term, 3-0). Extension of classical thermodynamics, microscopic analysis, statistical thermodynamics applied to engineering systems. Irreversible thermodynamics, thermoelectricity, and thermo-diffusion. Instructor: G. S. H. Lock. Textbook: Sonntag and Van Wylen, *Fundamentals of Statistical Thermodynamics.*

MEC E 452. *Mechanical Vibrations.* ♦3 (First Term, 3-0). The behavior of lumped systems of one and two degrees of freedom, vibration measuring instruments, vibration absorbers, vibration isolation. Lumped systems of several degrees of freedom, vibration of beams. Instructor: J. S. Kennedy. Textbook: Thomson, *Vibration Theory and Application.*

MEC E 462. *Principles of Design.* ♦4 (First Term, 3-2). Basic concepts in design, fatigue, lubrication, ball and roller bearings, dimensioning, creep, impact, reliability, optimization.

MEC E 463. *Design Project.* ♦2 (Second Term, 3-0). Selected design projects requiring the student to exercise his creative ability, to make assumptions and decisions and in general devise new designs, rather than analyse existing ones. Instructors: G. Ford and staff.

MEC E 470. *Heat Transfer I.* ♦3 (First Term, 3-0). Mechanisms of heat transfer, Steady and unsteady heat conduction. Free and force convection for laminar and turbulent conditions. Thermal radiation. Instructor: G. S. H. Lock. Textbook: Holman, *Heat Transfer.*

MEC E 471. *Heat Transfer II.* ♦3 (Second Term, 3-0). Selected topics in conductive, radiative, and convective heat transfer. Instructor. C. M. Rodkiewicz.

MEC E 480. *Advanced Strength of Materials II.* ♦3 (Second Term, 3-0). Thin-walled pressure vessels, cladding, thick cylinders, shrink fits, theory of failures and applications, torsion, stability, fracture mechanics, crack propagation. Instructor: G. Ford. Textbook: Seely and Smith, *Advanced Mechanics of Materials.*

MEC E 485. *Mechanics of Solids.* ♦3 (Second Term, 3-0). Review of basic concepts of stress and strain, energy principles, temperature stresses, stress concentration, impact loading, fatigue, creep, yield criteria, contact stresses, hardness, viscous flow, lubrication. Instructor: J. B. Haddow. Textbook: Long, *Mechanics of Solids and Fluids.*

MEC E 490. *Power Plant Engineering.* ♦3 (First Term, 3-0). Economics, design, and equipment of modern power stations and systems. Instructor: D. Panar.

## 84.7.2 / GRADUATE COURSES

MEC E 500. *Design Project.* ♦0 (time equivalent to one-term course).

MEC E 520. *Advanced Combustion Engineering.* ♦3 (First Term, 2-3/2).

MEC E 521. *Advanced Combustion Engineering (Design).* ♦3 (Second Term, 2-3/2).

MEC E 530. *Introduction to Viscous Laminar Flow Theory.* ♦3 (First Term, 3-0). Instructor: C. M. Rodkiewicz.

MEC E 535. *Gas Dynamics.* ♦3 (First Term, 3-0). Instructor: C. M. Rodkiewicz.

MEC E 536. *Aerodynamics of Rarefied Gases.* ♦3 (Second Term, 3-0). Instructor: D. J. Marsden.

MEC E 540. *Thermodynamics.* ♦3 (First Term, 3-0). Instructor: G. S. H. Lock.

MEC E 550. *Dynamics of Structures.* ♦3 (Second Term, 3-0). Instructor: J. S. Kennedy.

MEC E 570. *Conduction Heat Transfer.* ♦3 (First Term, 3-0). Instructor: G. W. Sadler. Textbook: Arpaci, *Conduction Heat Transfer.*

MEC E 572. *Laminar Convection.* ♦3 (Second Term, 3-0). Instructor: G. S. H. Lock.

MEC E 573. *Turbulent Convection.* ♦3 (Second Term, 3-0). Instructor: G. S. H. Lock.

MEC E 575. *Thermal Radiation.* ♦3 (Second Term, 3-0). Instructor: G. W. Sadler. Textbook: Hottel and Sarofim, *Radiative Transfer.*

MEC E 580. *Theory of Elasticity.* ♦3 (First Term, 3-0). Instructor: D. G. Bellow. Textbooks: Timoshenko and Goodier, *Theory of Elasticity;* and Sokolnikoff, *Mathematical Theory of Elasticity.*

MEC E 581. *Theory of Elastic Stability.* ♦3 (Second Term, 3-0). Instructor: D. G. Bellow. Textbook: Timoshenko and Gere, *Theory of Elastic Stability.*

MEC E 582. *Theory of Plates.* ♦3 (First Term, 3-0). Instructor: K. C. Cheng. Textbook: Timoshenko and Woinowsky-Krieger, *The Theory of Plates and Shells.*

MEC E 583. *Theory of Shells.* ♦3 (Second Term, 3-0). Instructor: J. R. Colbourne. Textbook: Flügge, *Stresses in Shells.*

MEC E 585. *Theory of Plasticity.* ♦6 (3-0). Instructor: J. B. Haddow. Textbook: Hill, *Mathematical Theory of Plasticity.*

### 84.7.3 / READING PROJECTS

MEC E 630. *Continuum Mechanics.* Maximum ♦6.
MEC E 635. *Gas Dynamics.* Maximum ♦6.
MEC E 636. *Rarefied Gas Dynamics.* Maximum ♦6.
MEC E 650. *Vibrations.* Maximum ♦6.
MEC E 670. *Conduction.* Maximum ♦6.
MEC E 672. *Convection.* Maximum ♦6.
MEC E 680. *Elasticity.* Maximum ♦6.
MEC E 682. *Plates.* Maximum ♦6.
MEC E 683. *Shells.* Maximum ♦6.
MEC E 685. *Plasticity.* Maximum ♦6.

## 84.8 / *Metallurgy*

Department of Mining and Metallurgy

### 84.8.1 / UNDERGRADUATE COURSES

MET E 253. *Materials Science.* ♦3 (First Term, 3-0). An introduction to the science of materials based on the physics and chemistry of their internal structure and atomic bonding forces as related to the ultimate structure of solids. Fundamentals of crystallography and x-ray diffraction. Imperfections in solids, such as point defects, dislocations, and grain boundaries. A brief introduction to binary phase equilibria. Observed mechanical, thermal, electric and magnetic behavior of metals, alloys, semiconductors, ceramics, plastics, glasses, clays, asphalt, and composite materials in terms of fundamental concepts. Textbook: Van Vlack, *Elements of Materials Science,* second edition. Reference: Wulff, ed., *The Structure and Properties of Materials.* vol. i, iii, iv.

MET E 355. *Process Metallurgy I.* ♦4 (First Term, 3-3). Fundamentals and application of mineral dressing processes, including screening, practical size distribution of an ore grind, cominution theories, crushing and grinding, thickening, filtering, jigging, flowing film concentration, amalgamation, static sink float, magnetic and electrostatic separation. References: Gaudin, *Principles of Mineral Dressing;* Beke, *Principle of Comminution;* Orr and Dallavalle, *Fine Particle Measurement;* Foust, *Principles of Unit Operations;* Perry, *Chemical Engineers' Handbook.*

MET E 356. *Metallurgical Thermodynamics and Kinetics.* ♦3 (Second Term, 3-0). Application of thermodynamics and kinetics to problems in extractive and solid state metallurgy; review of mathematical prerequisites, the degradation of energy, entropy and free energy of solid metals, liquid metals, metal-slag equilibria, reduction equilibria, principles of electrometallurgy, formal basis of diffusion theory, kinetics of metallurgical processes. References: Darken and Gurry, *Physical Chemistry of Metals;* Kubaschewski and Evans, *Metallurgical Thermochemistry.*

MET E 362. *Physical Metallurgy.* ♦4 (Second Term, 3-3). The physical metallurgy of metals and alloys. Atomic and crystal structure of metals. Phases in metal systems. Diffusion in metals. Elasticity, anelasticity and plasticity. Recovery, recrystallization and grain growth. Heat-treatment and engineering properties of steels, cast irons, and selected non-ferrous alloys. Corrosion and oxidation. Metallurgy of welding and joining. References: *Elements of Physical Metallurgy,* second edition; Samans, *Engineering Metals and their Alloys.*

MET E 370. *Fundamentals of Physical Metallurgy I.* ♦4 (Second Term, 3-3). Elements of crystallography. X-ray, electron, and neutron diffraction. Thermodynamics of solids. Solidification. Phase equilibria. Crystal lattice defects. Diffusion and diffusion controlled transformations. Theory of alloys. References: Reed-Hill, *Physical Metallurgy Principles;* Smallman-Ashbee, *Modern Metallurgy.*

MET E 404. *Practical Experience.* ♦1. Before being granted his degree, a student must satisfy the Department that he has had at least six months' practical experience in mining, metallurgy, or geological field work. A suitable report on practical experience must be prepared and submitted to the Department *not later* than December 1 of the fourth year. Before starting to write the report, the student should consult the Department as to the suitability of the topic and the method of presentation.

MET E 433. *Mill Design.* ♦2 (Second Term, 0-3). Flow sheet design, calculation of power and capacities for machines, quality control, instrumentation, sampling, testing, plan and elevation of mills, costs.

MET E 455. *Process Metallurgy II.* ♦3 (First Term, 3-3/2). Fundamentals and applications of the hydrocyclone, flotation. Application of pyrometallurgical processes to the production of common, rare and refractory metals. Drying, calcining, sintering, roasting, smelting, distillation, direct reduction, thermal decomposition, liquation, metallurgical calculations and design. References: Ward, *An Introduction to the Physical Chemistry of Iron and Steel Making;* Bradley, *The Hydrocyclone;* Gaudin, *Flotation,* second edition; Hopkins, *Physical Chemistry and Metal Extraction;* Dennis, *Metallurgy of the Non-Ferrous Metals.*

MET E 456. *Process Metallurgy III.* ♦3 (Second Term, 3-3/2). Fundamentals and application of hydrometallurgical and electrometallurgical processes: high and low temperature and pressure leaching, precipitation, evaporation, solvent extraction, ion exchange, adsorption, electro winning and refining, metallurgical calculations and design. References: Burkin, *The Chemistry of Hydro-Metallurgical Processes;* Kunin, *Ion Exchange Resins,* second edition; Martin and Miles, *Chemical Processing of Nuclear Fuels;* Mantel, *Industrial Electrochemistry.*

MET E 461. *Applications of Physical Metallurgy.* ♦7 (3-0; 3-3). Properties of pure metals. Solidification, working, and annealing. Strengthening mechanisms. Effects of environment, aqueous and liquid metal corrosion, oxidation, radiation. Two-phase alloys. Steels, commercially important alloys, cast irons, corrosion and heat resistant alloys. Sintered metal powders. Refractory materials. Composite materials. Metallurgy of welding and joining. References: Brick and Phillips, *Structure and Properties of Alloys;* Uhlig, *Corrosion and Corrosion Control;* Dieter, *Mechanical Metallurgy;* Lancaster, *The Metallurgy of Welding, Brazing, and Soldering.*

MET E 467. *Plant Operation and Design.* ♦3 (Second Term, 2-3). Principles of plant design, production flow and movement, automation in the metallurgical industry, testing, inspection, quality control.

MET 465. *Metallurgical Research Project.* Research on current topics in metallurgical engineering, including physical, chemical, and mechanical metallurgy, and mineral processing.

MET E 470. *Fundamentals of Physical Metallurgy II.* ♦4 (First Term, 3-3). Kinematics and dynamics of dislocations in crystals. Factors affecting the flow stress of metals. Interaction of dislocations with lattice defects and other perturbations. Precipitation hardening. Decomposition of austenite. Deformation twinning and martensite transformation. Elasticity and internal friction. Fracture, creep and fatigue. Prerequisite: MET E 370. Reference: Reed-Hill, *Physical Metallurgy Principles.*

MET E 490. *Colloquium.* ♦1 (Second Term, 0-1). Meetings of staff and fourth-year students for discussion of topics from recent literature.

## 84.8.2 / GRADUATE COURSES

MET E 500. *Design Project.* ♦3. Detailed Engineering report in the student's major area of interest.

MET E 502. *Advanced Crystallography* ♦3 (2-3). Fourier transforms, Bessel functions, and group theory as required for the study of X-ray scattering and development of point groups and space groups. Coherent and incoherent scattering of X-rays. Laue equations, reciprocal lattice and Polanyi layer line equations. Use of the Fourier Synthesis and the Patterson function in structure determination. The role of the computer in structure analysis. The use of the International Tables and the analysis of data obtained from the Weissenberg and Precession methods.

MET E 503. *Corrosion.* ♦3 (3-0). Quantitative application of thermodynamics and of electrochemical principles to corrosion reactions. Surface chemistry of corrosion and inhibition. Effect of metallurgical and mechanical factors. Atmospheric and soil corrosion. Oxidation and tarnish.

MET E 506. *Research Techniques in Metallurgy.* ♦3 (2-3). Statistical analysis, electron diffraction, crystal growth, diffuse scattering of X-rays, electron emission, high speed strain measurements, internal friction and radioactive tracers. Zone refining, high pressure, and vacuum processes.

MET E 507. *Lattice Imperfections and the Mechanical Behavior of Solids.* ♦3 (3-0). Elasticity of crystals; point, line and plane defects; anelasticity; plastic yielding; strain hardening; alloy hardening; fracture, recovery, and crystallization; creep; fatigue; radiation damage.

MET E 508. *Special Topics in Metallurgical Thermodynamics and Kinetics.* ♦3 (3-0). Heterogeneous reactions involving mass transport by diffusion or vapor phase chemical reactions, solid state reactions, and formation of nonequilibrium phases and other subjects of current interest.

MET E 509. *Theory of Alloy Phases.* ♦3 (3-0). Application of thermodynamics, zone theory, and other pertinent concepts to study of the nature and formation of solid solutions and intermediate phases. Systematic analysis of the variables which are active in alloy formation. Correlation of the nature of the bonding, the crystal structure, and the physical properties.

MET E 510. *Special Topics in Process Metallurgy.* ♦3 (3-0). Topics related to current mechanical or physicochemical processes of mineral beneficiation, and recent developments in extractive metallurgical processing.

MET E 511. *Special Topics in Physical Metallurgy.* ♦3 (3-0). Subjects of current interest such as kinetics of heterogeneous nucleation and phase transformations in solids, grain boundary phenomena, internal friction, physics and chemistry of friction and wear.

# 84.9 / *Mining*

Department of Mining and Metallurgy

## 84.9.1. / UNDERGRADUATE COURSES

M E 303. *Introduction to Mining.* ♦2 (First Term, 2-3/2). Elements of mining economics, field and geophysical prospecting, sampling and exploration of mineral deposits. Exercises in the calculation of ore tonnages and grades. References: Peele, *Mining Engineers' Handbook;* Young, *Elements of Mining;* Lewis, *Elements of Mining.*

M E 304. *Rock Mechanics and Explosives.* ♦2 (Second Term, 2-0). Introduction to rock mechanics, strength properties of rock, stress distributions and failure theories, support; explosives and blasting. References: Jaeger, *Elasticity, Fracture and Flow;* Isaacson, *Rock Pressure in Mines;* Coates, *Rock Mechanics Principles.*

M E 400. *Mining Methods.* ♦6 (3-0). Mine development; alluvial mining, open-cut mining, stoping and coal-mining methods; mine power, hoisting, haulage; ventilation; mine organization and management; valuation.

M E 401-403. *Mine Design.* Drafting-room work on the exploration, surface, and underground layout of a mine. Working groups of students are formed and to each group is submitted a problem involving the planning and design of a coal or metal mine. Detailed drawings and written discussion, with necessary specifications and costs, are required from each group. References: Staley, *Mine Plant Design;* Tillson, *Mine Plant;* Eaton, *Practical Mine Development and Equipment.*

M E 404. *Practical Experience.* ♦1. Before being granted his degree, a student must satisfy the Department that he has had at least six months' practical experience in mining, metallurgy, or geological field work. A suitable report on practical experience must be prepared and submitted to the Department *not later* than December 1 of the fourth year. Before starting to write the report, the student should consult the Department as to the suitability of the topic and the method of presentation.

M E 411. *Rock Mechanics Laboratory.* ♦2 (First Term, 0-3). Laboratory exercises in determining the physical properties of rock. Studies of simple mine structures under load; photoelastic models; behavior of granular or fragmented material.

## 84.9.2 / GRADUATE COURSES

M E 500. *Design Project.* ♦3. Detailed engineering report in the student's major area of interest.

M E 504. *Rock Mechanics.* ♦3 (either term, 3-0). Mechanical nature of rocks, theoretical models, failure criteria, design and stability of shafts, tunnels, pillars and stopes, subsidence, rock slopes, supports, dynamic effects and behavior.

# 84.10 / *Petroleum Engineering*

Department of Chemical and Petroleum Engineering

PET E 432. *Reservoir Analysis and Profitability—Primary Recovery.* ♦3 (First Term, 3-3/2). Fundamental concepts; estimation of reserves; profitability analysis; and project feasibility. Text: Craft, Hawkins, and Murray, *Applied Petroleum Reservoir Engineering.*

PET E 434. *Reservoir Analysis and Profitability—Enhanced Recovery.* ♦3 (Second Term, 3-3/2). Fundamental concepts; estimation of reserves; application of profitability analyses; and feasibility of enhanced recovery. Test: Smith, *Mechanics of Secondary Oil Recovery.*

## 84.11 / *Courses offered by Other Faculties and Schools*

### 84.11.1 / CHEMISTRY

CHEM 232. *Modern Chemistry.* ♦8 (3-3). Atomic and molecular structure; states of matter and intermolecular forces; solution chemistry, chemical equilibrium; inorganic chemistry of selected elements; organic chemistry. Prerequisite: Chemistry 130 or Chemistry 30 of High School, or equivalent.

CHEM 352. *Organic Chemistry.* ♦6 (3-2). Prerequisite: Chemistry 230 or 232.

CHEM 370. *Elementary Physical Chemistry.* ♦6 (3-3). The laws of thermodynamics; states of matter; solutions; equilibrium; phase rule; electrochemistry; colloids; kinetics of reaction. Prerequisite: Chemistry 230 or 232. Prerequisite or corequisite: Mathematics 180 or 201 or 206 or 207 or 214 or consent of the Department.

CHEM 432. *Inorganic Chemistry.* ♦6 (3-0). Prerequisite or corequisite: Chemistry 370 or 472.

CHEM 434. *Inorganic Chemistry.* ♦6 (First Term, 3-3; Second Term, 3-0). Prerequisite or corequisite: Chemistry 370 or 472.

CHEM 450. *Organic Chemistry.* ♦6 (3-0). Mechanisms and reactions or aromatic and aliphatic compounds. Prerequisites: Chemistry 350; 370 or 472.

CHEM 472. *Physical Chemistry.* ♦6 (3-3). Prerequisite: Chemistry 232.

### 84.11.2 / COMPUTING SCIENCE

CMPUT 300. *Problem Solving and Programming.* ♦3 (either term, 3-0). A short introduction to computers; analysing problems, designing algorithms and programming in FORTRAN IV; practical problems chosen from such topics as: numerical integration, numerical solutions of equations, of sets of linear equations, and of ordinary differential equations.

CMPUT 458. *Numerical Analysis.* ♦3 (Second Term, 3-0). Prerequisite: Computing Science 300, or equivalent, and Mathematics 312 and 313.

### 84.11.3 / ECONOMICS

ECON 303. *Principles of Economics.* ♦4 (2-0). An introduction to economic principles as applied to business organization and finance; price determination; enterprise costs and output optimization; commercial and central banking; national income analysis; public finance, monetary and fiscal policy in relation to the business cycle and economic growth.

ECON 304. *Principles of Economics.* ♦3 (either term, 3-0). An introduction to economic principles as applied to business organization and finance; price determination; enterprise costs and output optimization; commercial and central banking; national income analysis. Note: Economics 303 may be accepted as a prerequisite for senior courses in economics only if prior departmental approval is obtained.

### 84.11.4 / ENGLISH

ENGL 250. ♦4 (2-0). The reading of representative works of English literature, with some practice in writing.

### 84.11.5 / GEOLOGY

GEOL 230. *Engineering Geology I.* ♦3 (Second Term, 3-3). Rock forming minerals, clay minerals, economic minerals; igneous activity and igneous rocks; sedimentary rocks; rock weathering and soil formation; ground water; deformation of the earth's crust and isostasy; metamorphic rocks, earthquakes; economic geology. Laboratory exercises include identification of hand specimens and interpretation of geologic maps.

GEOL 330. *Engineering Geology II.* ♦3 (First Term, 3-3). The geological processes of particular importance to the Civil Engineer; rock weathering, landslides, rivers, waves, wind, and glaciation. Laboratory: study of air photographs and maps illustrating the results of these processes and demonstrating means of mapping of surficial deposits. Prerequisite: Geology 230 or consent of the Department.

GEOL 340. *Structural Geology I.* ♦3 (Second Term, 3-3). Geologic structures; stress and strain; principles of structural analysis. Prerequisites: Geology 230 and Physics 240 or consent of the Department.

GEOL 402. *Principles of Structural Geology.* ♦3 (Second Term, 3-3). Theoretical structural geology; non-orogenic structure; faults; folds; elementary petrofabric analysis; problems on folding and faulting. Prerequisite: Geology 303 and Physics 240, or consent of the Department.

GEOL 414. *Mineralogy.* ♦3 (First Term, 3-3). Principles of crystallography; physical and chemical properties of minerals. Determinative mineralogy. Prerequisite: Geology 230.

GEOL 421. *Intermediate Mineralogy.* ♦3 (Second Term, 3-3). Chemical crystallography, theory of X-ray diffraction and phase equilibria. Prerequisite: Geology 414 or consent of the Department. Corequisite: Chemistry 370 or consent of the Department. Note: Alternate years only. Not offered 1968-69.

GEOL 440. *Structural Geology II.* ♦3 (First Term, 3-3). Additional mathematical treatment of structural data; primary, penecontemporaneous, and secondary structures; structural analysis of the Canadian Rocky Mountains, orogenesis, and the growth of continents. Prerequisite: Geology 340. Note: Alternate years only. Not offered 1968-69.

GEOL 450. *Petrology.* ♦3 (First Term, 1-3). Study of igneous, sedimentary, and metamorphic rocks in hand specimens. Prerequisite: Geology 230 and 414.

GEOL 454. *Petrology.* ♦6 (3-3). Introduction to petrography; optical properties of common rock-forming minerals; classification and genesis of igneous and metamorphic rocks; examination of rock sections. Prerequisite: Geology 414.

GEOL 460. *Metallic Mineral Deposits.* ♦3 (Second Term, 3-3). Classification, mode of occurrence, and geological relations of various types of mineral deposits. Prerequisite: Geology 230 and consent of the Department.

GEOL 461. *Geology of Petroleum and Natural Gas.* ♦3 (First Term, 3-3). Origin, migration, and accumulation of petroleum and natural gas. Geological characteristics of petroleum and natural gas deposits. Prerequisites: Geology 403 and 405 or consent of the Department. Note: Alternate years only. Not offered 1968-69.

GEOL 462. *Photogeology.* ♦3 (Second Term, 1-3). The application of aerial photographs to the preparation of planimetric and geological maps.

Mapping of stratigraphy and structure on aerial photographs. Prerequisite: Geology 230 or consent of the Department. Note: Alternate years only. Not offered 1968-69.

GEOL 465. *Geomorphology.* ♦3 (First Term, 3-3). Land forms and the processes which create and modify them; weathering, mass-wasting, stream erosion, wave erosion, wind erosion, glaciation; study of land forms on aerial photographs and topographic maps; field trips. Prerequisite: Geology 230 or consent of the Department.

GEOL 466. *Glacial Geology.* ♦3 (Second Term, 3-3). Elements of glaciology; description of glacial deposits and land forms; periglacial phenomena; outline of glacial stratigraphy of North America; interpretation of glacial features from topographic maps and aerial photographs; examination of glacial sediments; field trips. Prerequisite: Geology 230 or consent of the Department. Textbook: Flint, *Glacial and Pleistocene Geology.*

GEOL 470. *Hyrdology.* ♦3 (3L). The occurrence, distribution, movement, and chemistry of groundwater as a function of the geological environment; groundwater as a geologic agent; methods of collection, organization, and use of hydrogeologic data; groundwater budgets, model studies, selected problems and case histories. Prerequisite: Geology 201 and consent of the Department.

## 84.11.6 / MATHEMATICS

MATH 214. *Calculus.* ♦8 (4-2). Basic notions of derivative and integral. Differentiation and integration of functions of one real variable. Applications. Partial differentiation. Multiple integration. Calculus of vector functions of one variable. Complex numbers. Infinite series. Prerequisite: Mathematics 30 and 31.

MATH 306. *Advanced Calculus.* ♦6 (5-0). Sequences and series, differential calculus of scalar fields, linear differential equations, multiple integrals. Line integrals. Theorems of Gauss, Green, and Stokes. Prerequisite: Mathematics 206 or consent of the Department. Note: Required for second-year honors students in Mathematics and Physics. Other students admitted only with the consent of the Department.

MATH 312. *Linear Algebra.* ♦3 (First Term, 3-2s). Algebra and geometry of vector spaces, linear transformations, and matrices. Linear equations (including computational methods). Quadratic forms and symmetric matrices. Elementary eigenvalue theory. Prerequisite: Mathematics 214, or consent of the Department.

MATH 313. *Differential Equations.* ♦3 (Second Term, 3-2s). Hyperbolic functions. Linear differential equations with constant coefficients and first-order systems. First order linear and nonlinear equations. Picard's method. Numerical techniques. Prerequisite: Mathematics 214, or consent of the Department.

MATH 404. *Advanced Calculus.* ♦6 (3-0). Vector analysis. Ordinary differential equations. Series solutions of differential equations. Gamma, Bessel, and Legendre functions. Fourier series. Boundary value problems. Prerequisite: Mathematics 304 or its equivalent.

MATH 408. *Theory of Functions of a Complex Variable.* ♦3 (either term, 3-0). Complex numbers. Complex series. Functions of a complex variable. Cauchy's theorem and contour integration. Conformal mappings. Schwartz-Christoffel transformation. Inverse Laplace transforms. Prerequisite or corequisite: Mathematics 313 or consent of the Department.

MATH 412. *Linear Algebra II.* ♦3 (either term, 3-0). Abstract vector spaces. Transformation of coordinates, Hermitian matrices. Characteristic values, similarity, diagonalization. Orthogonalization. Canonical forms of matrices. Quadratic forms, inner-products. Functions of matrices with application to linear systems of differential equations. Introduction to tensor analysis. Prerequisite: Mathematics 312 or consent of the Department.

MATH 413. *Advanced Calculus.* ♦3 (either term, 3-0). Linear second-order partial differential equations with constant coefficients, separation of variables. Gamma, Bessel, Legendre functions. Eigenvalues, eigenfunctions. Prerequisite: Mathematics 312-13 or consent of the Department.

MATH 414. *Advanced Calculus II.* ♦3 (Second Term, 3-0). Solution by series of boundary value problems for partial differential equations. Introduction to integrad transforms. Numerical methods. Prerequisite: Mathematics 413 or consent of the Department.

MATH 415. ♦6 (3-0). A full course with the content of Mathematics 413 and 414 combined. Prerequisite: Mathematics 312-13 or consent of the Department.

MATH 421. *Boundary Value Problems.* ♦6 (3-0).

MATH 430. *Advanced Mechanics.* ♦6 (3-0). Review of Newton's Laws. Lagrange's equations derived from Newton's Laws and D'Alembert's principle. The central force problem. Motion of a rigid body. Tops and gyroscopes. Variational principles. Hamilton's equations. Canonical transformations. Hamilton-Jacobi equation. Prerequisite: Mathematics 309 or Physics 370 or consent of the Department.

MATH 451. *Analysis.* ♦4 (2-0). Properties of real and complex numbers. Sequences and series. Functions. Differentiation. Sequences and series of functions. Set theory, metric spaces, compactness. Lebesgue integral. Prerequisite: Mathematics 413 or Mathematics 415 or consent of the Department.

MATH 480. *Cartesian Tensors and Applications.* ♦3 (First Term, 3-0). Euclidean vector spaces. Linear transformations and matrices. Algebra of cartesian tensors. Vector and tensor calculus. Determinants. Structure of second-order tensors. Isotropic tensors. Physical applications. Prerequisite or corequisite: Mathematics 404 or 415 or equivalent.

MATH 500. *Theory of Functions of a Complex Variable.* ♦6 (3-0). Complex numbers. Complex series. Functions of a complex variable. Cauchy's Theorem and the calculus of residues. Integral functions. Conformal representation. The Laplace and Fourier transforms. Prerequisite: Mathematics 404 and 415 or equivalent. Note: For students in the fourth year of special Engineering program.

MATH 555. *Hydro- and Aero-dynamics.* Classical hydrodynamics. Kutta-Joukowski theory of airfoils. Boundary layers. Flow of viscous fluid. Supersonic flow. Shock waves.

## 84.11.7 / PHYSICAL EDUCATION

P ED 218. *Activity Course.* ♦nil (0-2). Fitness, aquatic and recreational activities; tests in fitness and aquatics in the First Term, followed by student-selected recreational activities. Note: Course required of all first-year men.

P ED 228. *Activity Course.* ♦nil (0-2). Foundations of Physical Education with emphasis on fitness, followed by two electives in recreational activities. Note: Course required of all first-year women.

## 84.11.8 / PHYSICS

PHYS 230. *Dynamics, Waves, and Optics.* ♦8 (3-2/2s-3/2). Geometrical and physical optics: Doppler effect, reflection, refraction, plane and spherical mirrors, thin lenses, interference, diffraction polarization, light scattering. Waves: mechanical waves, oscillations, sound harmonic motion, resonance. Dynamics: kinematics, conservation laws, work, energy, momentum, gravitation.

PHYS 330. *Electricity and Magnetism.* ♦5 (First Term, 4-2/2s-3). Electrostatistics, the electric field, potential, capacitance, magnetic fields, electromagnetism, induced EMF, magnetic properties of matter, electromagnetic oscillations. Prerequisite: Physics 230, Mathematics 212.

PHYS 416. *Introduction to Wave Mechanics and Theory of Solids.* ♦4 (2-0). The Schrödinger equation, quantum statistics, binding forces, electron theory of solids, properties of metals and semi-conductors. Prerequisites: Physics 330 or Physics 380, Mathematics 303 or Mathematics 306.

PHYS 468. *Advanced Laboratory.* ♦3 (0-3). Methods in experimental atomic physics and spectroscopy. Corequisite: Physics 474.

PHYS 474. *Relativity and Introduction to Wave Mechanics.* ♦4 (2-0). Special relativity, wave mechanics; introduction to Schrödinger equation.

PHYS 480. *Electromagnetism.* ♦6 (3-3). Potential theory; descriptions of electromagnetic field using vector methods; Maxwell's equations; electromagnetic waves in continuous media and in guides; selected topics in electromagnetism. Prerequisite: Physics 340 or 380. Prerequisite or corequisite: Mathematics 404 or 421.

PHYS 510. *Statistical Physics.* ♦6 (3-0). The statistical basis of thermodynamics. Topics include irreversible processes, Boltzmann, Fermi-Dirac, and Bose-Einstein statistics, phase equilibria, transport phenomena, chemical reactions and fluctuations. Prerequisites: Physics 350, Mathematics 404, or 421.

PHYS 516. *Introductory Solid State Physics.* ♦4 (2-0). The theory of solids, including a study of the properties of metals, semi-conductors, and dielectrics. Prerequisite: Physics 474.

PHYS 520. *Geophysics.* ♦6 (3-0). Seismology and physics of the Earth's interior, gravity; heat flow; tectonophysics; geomagnetic, paleomagnetic, and electromagnetic methods in the study of the earth. Special techniques such as deconvolution and power spectrum estimation.

PHYS 530. *Physics of Atoms, Nuclei, and Crystals.* ♦4 (2-0). Relativity physics, quantum theory and wave mechanics, atomic structure and spectra, high energy radiations, nuclear structure, nuclear reactions and energy sources, quantum statistics, crystalline properties of the solid state. Prerequisite or corequisite: Physics 482.

PHYS 550. *Mathematical Physics.* ♦6 (2-1s). An introduction to the principal mathematical methods of dealing with the scalar and vector fields of Physics. Topics include the Sturm-Liouville theory of eigenvalue problems, matrices, partial differential equations, operational methods and Laplace transforms, Fourier transforms, Green's functions, integral equations and the nonlinear equations of hydrodynamics. One hour per week will be spent on class discussion of problems. Prerequisites: Physics 480, Mathematics 404 or 421.

PHYS 570. *Quantum Mechanics.* ♦6 (3-0). Application of quantum mechanics to elementary scattering theory. Perturbation methods. Semi-classical theory of radiation. Identical particles and spin. Prerequisites: Physics 480 and 474, Mathematics 404 or 421.

PHYS 572. *Nuclear Physics.* ♦4 (2-0). Introductory survey of modern experimental and theoretical nuclear physics. Prerequisite: Physics 474.

PHYS 576. *Reactor Physics.* ♦3 (Second Term, 3-0). Slowing of neutrons, neutron diffusion theory, the pile equations, critical dimensions for simple pile shapes, the neutron cycle, reactor control, health physics. Corequisite: Physics 572.

## 84.11.9 / STATISTICS

STAT 335. *Probability, Statistics, and Programming.* ♦3 (First Term, 3-2). The calculus of probability. Binomial, multinomial, Poisson, and normal distributions. Estimation. Tests of hypothesis and confidence limits. Tests of control and control charts. Sampling plans and sequential sampling. Computer programming with applications to Statistics. Prerequisite: A knowledge of basic programming.

STAT 450. *Probability and Statistics.* ♦6 (3-0). Theory of probability. Distribution functions and characteristic functions. Central Limit theorem. Sampling. Exact sampling distributions. Confidence intervals. Maximum likelihood. Method of least squares. Analysis of variance. Statistical inference. Prerequisites: Mathematics 304 and preferably Statistics 255 or equivalent.

*Mrs. Grace L. Cook, Associate Director of the School of Household Economics, and Dr. Elizabeth Empey, Director of the School.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# School of Household Economics

## 91 / INTRODUCTORY

### 91.1 / *Members of the School*

#### 91.1.1 / STAFF

*Professor and Director*
(Miss) E. L. EMPEY, Ph.D.

*Associate Professors*
(Mrs.) H. BENTLEY, M.S. (on leave)
(Miss) R. RENNER, Ph.D.
(Mrs.) H. SAMUEL, M.A.

*Assistant Professors*
(Miss) R. CHENEY, M.Sc.
(Miss) T. DENNIS, M.S.
(Miss) E. DOWN, Ph.D.
(Mrs.) M. JONES, B.Ed.
(Miss) N. KERR, M.Sc.
(Miss) V. LEFEBVRE, M.S.
(Miss) A. OSTAPOVITCH, M.A.
(Miss) J. STRANG, M.Sc.

*Lecturers*
(Miss) E. CAIRNS, B.Sc. (H.Ec.)
(Miss) M. SHAW, B.Sc. (H.Ec.)

*Sessional Instructors*
(Mrs.) E. BARNES, B.Sc. (H.Ec.)
(Mrs.) M. GEE, M.Sc.
(Mrs.) D. KIEREN, M.Sc.
(Mrs.) J. REIERSON, B.Sc. (H.Ec.)
(Mrs.) D. ROSS, B.Sc. (H.Ec.)
(Miss) B. STUART, B.Sc. (H.Ec.)
(Mrs.) M. ZARKADAS, B.Sc. (H.Ec.)

#### 91.1.2 / ADDITIONAL MEMBERS OF SCHOOL COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Professor*
J. W. GILLES, Ed.D. (Evening Credit and Summer Session)

*Associate Professor*
J. A. FORBES, M.A. (Art)

*Assistant Professor*
D. D. TANNER, Ph.D. (Chemistry)

*Representative*
(Miss) D. ARMSTRONG, B.Sc. (H.Ec.), R.D., Alberta Registered Dietitians Association

*Registrar of the University*
A. D. CAIRNS, B.A.

### 91.2 / *General Information*

Degree programs in Household Economics have been offered at The University of Alberta since 1918, when a Department of Household Economics was established. In 1928 the School of Household Economics was organized under the Faculty of Arts and Science. In 1963, it was placed under the newly organized Faculty of Science, and in 1966 it became an independent School.

The programs of study offered are designed to provide the student with a foundation in arts and science and household economics. The programs are three-year ones; the first year may be taken at The University of Calgary, The University of Lethbridge, or at one of the following junior colleges: Red Deer, Camrose, Medicine Hat, or Grande Prairie (see the Calendar for the appropriate university or college). Additional study or training must be completed if the graduate wishes to teach or become a dietitian.

A student may enrol in one of the following programs of study: *foods and nutrition, clothing and textiles,* or the *general program.*

(1) The *foods and nutrition program* is suitable for students planning to become dietitians, nutritionists or home economists in the food industry. Postgraduate study in foods and nutrition may be pursued at this or another university, and financial aid is usually available; excellent opportunities are open to the holder of a master's or Ph.D. degree.

To qualify as a professional dietitian, the graduate must spend twelve months in an interneship program approved by the Canadian Dietetic Association. It is now possible for a student to complete part of this twelve-month interneship during the summers between university sessions, thus integrating interneship with university study; the student is paid during the time she is serving interneship each summer.

(2) The *clothing and textiles program* is suitable for students who are especially interested in clothing construction and design and textiles, and who wish to concentrate their studies in this area to the exclusion of other facets of home economics. The study of textiles and clothing and applied art may be continued in postgraduate programs in other universities.

(3) The *general program* is suitable for students planning to become teachers or home economists with the Department of Agriculture and with utility companies. Those wishing to teach must complete further study in the Faculty of Education—one year to qualify for a teaching certificate or two years to qualify for the Bachelor of Education degree. (See Faculty of Education section of the Calendar.)

It should be noted that if graduates of either the *foods and nutrition* or the *clothing and textiles* program wish to teach, they too must complete further study in the Faculty of Education, but they must also take those household economics courses from the general program which they lack. Thus, qualifying for a teaching certificate might take longer than one year; completing the requirements for the Bachelor of Education degree could be accomplished in two years. Students interested in following this program should obtain advice during their first year at University or as soon after as possible.

Graduates who have completed any one of the three programs and who have particular aptitudes for work in radio, television and journalism, may find opportunities in these fields. It is possible for graduates who are interested in social work to pursue this interest by enrolling in a postgraduate program in some school of social work; it should be realized, however, that only certain personality types will succeed in social work.

Students are invited to consult the Director of the School with respect to the choice of courses.

The Faculty of Education (Department of Secondary Education) offers a B.Ed. degree with a major in Household Economics and a M.Ed. degree with a major in Household Economics; further information may be obtained by consulting the Faculty of Education section of the Calendar.

# 92 / SCHOOL REGULATIONS

## 92.1 / *Admission*

The admission requirements of the School are set out in § § 13.1 and 13.9 of the University Regulations section of the Calendar.

## 92.2 / *Academic Standings and Graduation*

(1) To be granted the degree of B.Sc. in Household Economics students must present passing grades (4 or better) in a minimum of fourteen full courses, not less than 3 in a fifteenth course, and a grade-point average of at least 5.0 in all courses credited towards the degree after the first year.

(2) Where two half-courses are taken in place of one full course, the minimum specified mark must be achieved in each course.

(3) Students transferring to this University with advanced standing will be required to complete at least five of the fifteen courses at The University of Alberta.

(4) The normal program is five full courses per year in each of the first two years and five and one-half courses in the third year. The Director may, in exceptional circumstances, permit a student to proceed to a degree over a longer period, or to meet requirements in a shorter period by attendance at summer session and by taking extra courses during the regular session.

(5) A student will not be allowed to write more than five supplemental examinations for the purpose of obtaining passing marks or raising her grade-point average to the required 5.0. A student will not be allowed to write more than two supplemental examinations in any year.

(6) A student who is repeating a year will be granted no supplemental privileges in the courses taken that year and must pass all courses with a grade-point average of 5.0 to be allowed to continue. The privilege of repeating a year will be granted to a student not more than once during her candidacy for a degree in this School, unless by special permission of the Director.

(7) Students who interrupt their degree program are warned that after an absence of two calendar years from academic study at university level they may be required to comply with any new regulations which have come into effect in regard to their program and requirements. If the absence has been of more than five years' duration, the student may be required to take placement tests.

## 93.1 / *The Degree of B.Sc. in Household Economics*

### 93.1.1 / FOODS AND NUTRITION PROGRAM

*First Year*

H EC 221 (Basic Foods I) (half-course)
Biology 130 or 230
Chemistry 230
Chemistry 250
English 210
Microbiology 201 (half-course)
Physical Education 228

*Second Year*

H EC 321 (Basic Foods II) (half-course)
H EC 323 (Food Purchasing and Preservation) (half-course)
Either H EC 303 (Home Management) (half-course) and H EC 355 (Family Economics) (half-course); or Business 300
Biochemistry 300
Physiology 261
Arts option

*Third Year*

H EC 458 (Nutrition)
Five half-year courses chosen from the following:
- H EC 425 (Diet and Disease)
- H EC 427 (Experimental Foods)
- H EC 429 (Advanced Experimental Foods)
- H EC 455 (The Family)
- H EC 459 (Presentation and Communication)
- H EC 461 (Institution Management I)
- H EC 463 (Institution Management II)
- H EC 201 (Clothing Design and Selection)
- H EC 309 (Textiles)

Senior Arts option
Approved option

NOTE: To qualify for entry into an approved dietetic interneship Business 300 must be taken; a course in Economics, Sociology, or Psychology must be taken as either the Arts option or Senior Arts option; the five half-year courses to be taken in the third year will be H EC 425, 427, 459, 461, 463; the approved option of the third year must be Industrial Relations 420 or 302.

### 93.1.2 / CLOTHING AND TEXTILES PROGRAM

*First Year*

H EC 201 (Clothing Design and Selection) (half-course)
H EC 203 (Clothing Construction and the Basic Pattern) (half-course). Students granted advanced placement will substitute another half-course.
Art 200
Chemistry 250
English 200 or 210
Physical Education 228

*Second Year*

H EC 350 (Applied Art)
Two half-courses in Clothing and Textiles (see NOTE A)
Art 231
History 200
Approved Arts or Science option

*Third Year*

Either H EC 459 (Presentation and Communication) or H EC 355 (Family Economics) (half-courses)
Four half-year courses in Clothing and Textiles (see NOTE A)
Approved Senior Arts option
Approved Arts option (see NOTE B)
Approved option (see NOTE B)

NOTE A: The following courses are available:
- H EC 307 (Clothing Construction)
- H EC 309 (Textiles)
- H EC 311 (Consumer Textiles)
- H EC 401 (Consumer Costume Design)
- H EC 403 (History of Costume and Textiles)
- H EC 405 (Original Apparel Design)
- H EC 407 (Tailoring)
- H EC 411 (Advanced Textiles)

NOTE B: One of these two options must be a senior course.

### 93.1.3 / GENERAL PROGRAM

*First Year*

H EC 201 (Clothing Design and Selection) (half-course)
H EC 221 (Basic Foods I) (half-course)
Chemistry 250
English 200 or 210
Physical Education 228
Two Arts or Science options (See NOTE)

*Second Year*

H EC 203 (Clothing Construction and the Basic Pattern) (half-course). Students granted advanced placement will substitute H EC 309
H EC 303 (Home Management) (half-course)
H EC 307 (Clothing Construction) (half-course)
H EC 321 (Basic Foods II) (half-course)
Economics 200. Students not possessing credit in Mathematics 30, or equivalent, should substitute Economics 305
Senior Arts or Science option (see NOTE)
Arts or Science option

*Third Year*

H EC 325 (Nutrition) (half-course)
H EC 327 (Nutrition) (half-course)
H EC 350 (Applied Art)
H EC 355 (Family Economics) (half-course)
H EC 455 (The Family) (half-course)
H EC 459 (Presentation and Communication) (half-course)
Senior option (see NOTE)
Option. If H EC 309 has not been previously taken, it must be chosen

NOTE: Each student must select a minimum of three Arts or Science courses in a subject of concentration. Students who plan to qualify as teachers after obtaining the B.Sc. degree in Household Economics are reminded that Psychology 202 and Philosophy 240 are prerequisites for courses in the first year of the B.Ed program.

### 93.2 / *Inter-Disciplinary B.Sc. Program in Food Science*

A four-year inter-disciplinary program in Food Science is offered co-operatively by the Faculty of Agriculture, the School of Household Economics, and the Faculty of Science. It allows students to specialize in this expanding field more than is possible in the third- and fourth-year specialized program in Food Science offered by the Faculty of Agriculture, or the Foods and Nutrition program offered by the School of Household Economics.

The program is designed so that students may register in it immediately on entering University or may transfer from the Faculties of Agriculture or Science or the School of Household Economics after their first or possibly after their second year.

For details of the program see § 33.2 in the Faculty of Agriculture section of the Calendar.

### 93.3 / *The B.Sc. in Household Economics After a Previous Degree*

*B.Sc. in Household Economics After B.Ed.* Students who have qualified for the degree of Bachelor of Education may proceed to the degree of Bachelor of Science in Household Economics if they have completed at least thirteen courses in Arts and Science and Household Economics. They will be required to complete the B.Sc. program in Household Economics with a minimum of six senior courses and a grade-point average of 5.0 or better in these courses.

*B.Sc. in Household Economics After B.A. or B.Sc.* Students who have qualified for the degree of B.A. or B.Sc. from The University of Alberta may proceed to the degree of B.Sc. (H.Ec.) by completing a program of at least nine full courses (or the equivalent) prescribed by the School of Household Economics and attaining a grade-point average of 5.0 or better in these courses.

### 93.4 / *Graduate Study*

Graduate work leading to the degree of Master of Science may be undertaken in the School of Household Economics. The major work may be done in the field of nutrition where excellent facilities are available for a limited number of students interested in fundamental research. Students wishing to pursue graduate work should consult the Director of the School of Household Economics and familiarize themselves with procedures and regulations laid down by the Faculty of Graduate Studies.

## 94 / DETAILS OF COURSES

### 94.1 / *General Information*

Courses open to students in the School of Household Economics are listed here in alphabetical order, whether they are offered by the School of Household Economics or by another faculty or school.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Following the title of the course is the symbol "♦" standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages. An ordinary full-year course is weighted 6. A half-course is normally weighted 3. Some honors and graduate courses involving research may vary in weight according to the length and difficulty of the research project. Some courses are offered for credit only, and carry no weight.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours, respectively, required by the course in a week. Where they appear, the symbol "s" denotes seminar hours and the symbol "L" denotes combined lecture-laboratory hours. The expression "3/2" means three hours of instruction every second week. The hours of instruction for a full course are the same in both terms unless otherwise indicated. If the course is a half-course, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 94.2 / *Art*

ART 200. *Introduction to the History of Art.* ♦6 (3-0). Fundamental concepts underlying painting and the plastic arts; the major styles and contributions of each important period.

ART 231. *Fundamentals of Visual Communication I.* ♦6 (2-4). A studio-based course concerned with the analysis of information expressed visually in two and three dimensions, and with illusion implied in line and color.

## 94.3 / *Biochemistry*

BIOCH 300. *General Course.* ♦6 (3-3). Structure and chemistry of the cell; the chemistry and metabolism of carbohydrates, lipids, proteins and nucleic acids; the molecular biology of enzymes and genes as related to the functioning of the living cell. Prerequisites: Chemistry 230 and 250.

BIOCH 372. *Topics in Biochemistry.* ♦6 (3-1s-3). The topics of Biochemistry 300 discussed in a more rigorous manner. Seminars on current research in Biochemistry and Molecular Biology. Prerequisites: Chemistry 230 and 250. Chemistry 370 or 372 and Mathematics 201 desirable as prerequisites or corequisites. Note: Designed for graduate students, honors students, and selected students from all departments.

## 94.4 / *Biology*

BIOL 130. *Introductory Biology.* ♦6 (3-3). Note: Not open to students with credit in Biology 30.

BIOL 230. *Intermediate Biology.* ♦6 (3-3). Prerequisite: Biology 30 or Biology 130. Note: Designed for students with high school Biology 30.

## 94.5 / *Business*

BUS 300. *Administrative Principles.* ♦6 (3-0). Functions of management—planning, organization, staffing, directing, and controlling.

## 94.6 / *Chemistry*

CHEM 130. *Introductory General Chemistry.* ♦6 (3-3). A beginning course in Chemistry covering the topics of high school chemistry from a more advanced point of view. Note: May not be taken for credit by students who have credit in Grade XII Chemistry 30.

CHEM 230. *Inorganic Chemistry.* ♦6 (3-1s-3). The fundamental concepts of Chemistry as applied to the elements and their compounds. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

CHEM 250. *Organic Chemistry.* ♦6 (3-1s-3). Introduction to a study of the compounds of carbon. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent. Notes: Students with credit in Chemistry 230 normally will proceed to Chemistry 350, not 250. Students not concurrently taking Chemistry 230 are required to take the one-hour seminar.

## 94.7 / *Economics*

ECON 200. *Principles of Economics.* ♦6 (3-0). A survey of various aspects of economics; the nature of economic problems and systems; the functions of money; commercial and central banking; national income analysis; monetary and fiscal policy; pricing under competitive and monopolistic conditions; selected topics in analysis and policy. Prerequisite: Mathematics 30 or 100.

## 94.8 / *English*

ENGL 200. *A Survey of English Literature from Chaucer to the Twentieth Century.* ♦6 (3-0). A close study of representative masterpieces. Essays and tests on the prescribed literature to afford practice in setting down ideas in good English.

ENGL 210. *English Language and Literature.* ♦6 (3-0). Designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

## 94.9 / *History*

HIST 200. *European History.* ♦6 (3-1s). The evolution of European society from the decline of the Roman Empire in the West to the present.

## 94.10 / *Household Economics*

H EC 201. *Clothing Design and Selection.* ♦3 (either term, 3-3). Practical application of principles of design in clothing selection. Becoming and appropriate clothing for the individual. Consideration of age, social and economic factors.

H EC 203. *Clothing Construction and the Basic Pattern.* ♦3 (either term, 3-3). A basic commercial pattern fitted in muslin and developed into a master pattern. Basic garment construction. Construction of a selected dress design in appropriate fabric.

H EC 221. *Basic Foods I.* ♦3 (either term, 3-3). Scientific principles involved in preparing and handling selected foods: fruits, vegetables, cereals, flours, leaveners, sugars, batters and doughs. Corequisite: Chemistry 250.

H EC 303. *Home Management.* ♦3 (First Term, 3-3). Introduction to the principles of home management; application of these principles to the management of time and energy. Selection and arrangement of equipment in the home.

H EC 307. *Clothing Construction.* ♦3 (either term, 3-3). Construction techniques applied to specific problems. Evaluation of methods used in present-day clothing construction. Considerations of individual resources, need, skills and management. Prerequisite: Household Economics 203.

H EC 309. *Textiles.* ♦3 (either term, 3-3). Fibre production, yarn development, fabric construction and finishes as applied to end uses in apparel and household fabrics.

H EC 311. *Consumer Textiles.* ♦3 (either term, 3-0). Interpretation of basic textile information and other factors related to consumer selection, use and care of apparel and household textiles. Prerequisite: Household Economics 309.

H EC 321. *Basic Foods II.* ♦3 (either term, 3-3). Scientific principles involved in preparing and handling selected foods: meats, fish, poultry, eggs, milk, cheese, fats, and oils. Prerequisite: Chemistry 250.

H EC 323. *Food Purchasing and Preservation.* ♦3 (Second Term, 3-3). Recent methods of preserving foods. Preparation and service of meals. Prerequisites: Household Economics 221, Household Economics 321, and Microbiology 201.

H EC 325. *Nutrition.* ♦3 (either term, 3-3). A study of carbohydrates, fats, and proteins, and the role which minerals and vitamins play in their metabolism; food sources and requirements of man at various phases of the life cycle. Laboratory exercises in preparing and serving meals. Prerequisites: Chemistry 250, Household Economics 221 and/or Household Economics 321.

H EC 327. *Nutrition.* ♦3 (either term, 3-3). Emphasis will be on minerals and vitamins; their chemical and physiological roles in metabolism; food sources and requirements of man at various phases of the life cycle. Laboratory studies on components of foods. Prerequisite: Household Economics 325.

H EC 350. *Applied Art.* ♦6 (3-3). The principles and elements of design; selection and arrangement of materials and objects in the home; analysis of house plans. Historic styles of architecture and furniture and their relation to contemporary design.

H EC 352. *Applied Art.* ♦6 (3-0). The principles and elements of design; selection and arrangement of materials and objects in the home; analysis of house plans. Historic styles of architecture and furniture and their relation to contemporary design.

H EC 355. *Family Economics.* ♦3 (Second Term, 3-0). Standards of living; family income, savings, and expenditures; consumer economics and consumer education.

H EC 401. *Costume Design.* ♦3 (Second Term, 6L). Principles of designing clothes by flat pattern techniques. Development of designs for specific garments. Development of original designs and construction of the garments in appropriate fabrics. Prerequisites: Household Economics 307 and Household Economics 309.

H EC 403. *History of Costume and Textiles.* ♦3 (First Term, 3-0). Fabrics and costumes from ancient times to the present day; their relationship to life of the times and their importance in evolution and inspiration of modern dress. Prerequisite: History 200.

H EC 405. *Original Apparel Design.* ♦3 (Second Term, 3-3). Principles of designing clothes by draping techniques. Development of original designs and construction of the garments in appropriate fabrics. Study of the fashion industry and contemporary designers. Prerequisites: Household Economics 307; Household Economics 350 and Household Economics 403.

H EC 407. *Tailoring.* ♦3 (First Term, 6L). Specialized tailoring techniques applied to the construction of a suit or coat from a commercial pattern. Evaluation of methods used in tailored garments. Prerequisites: Household Economics 307 and Household Economics 309.

H EC 411. *Advanced Textiles.* ♦3 (Second Term, 2-4). Physical, chemical and microscopic analysis of textiles. Prerequisites: Household Economics 309; and Chemistry 230 or consent of the School.

H EC 425. *Diet and Disease.* ♦3 (Second Term, 3-0). Food and diet for the sick. Description of various diseases and the role of diet in managing them. Corequisite: Household Economics 458 or Household Economics 325.

H EC 427. *Experimental Foods.* ♦3 (First Term, 3-3). Lectures: Advanced study of chemical and physical principles involved in preparation of foods. Laboratory: Sensory evaluation and objective tests used for food research. Prerequisites: Chemistry 250; Household Economics 221 and 321 or consent of the School.

H EC 429. *Advanced Experimental Foods.* ♦3 (Second Term, 3-3). Recent developments and further study of objective and subjective tests in food research. Conducting and reporting individual experiments. Prerequisite: Household Economics 427.

H EC 455. *The Family.* ♦3 (First Term, 3-0). History of the family; the family life cycle and family relationships, research studies in marriage relationships, research studies in marriage and the family.

H EC 458. *Nutrition.* ♦6 (3-3). The principles of nutrition applied to feeding of individuals and of the family group under normal conditions. Diets for special cases. Prerequisite: Biochemistry 300.

H EC 459. *Presentation and Communication.* ♦3 (either term, 3-3). Introduction to the principles of communication; their application in interpersonal, group and mass audience situations relevant to home economics. Practice in verbal communication, demonstration and display.

H EC 461. *Institution Management I.* ♦3 (First Term, 3-0). Operational techniques and special problems encountered in the food service industry.

H EC 463. *Institution Management II.* ♦3 (Second Term, 3-0). Application of principles of management to the food service industry.

H EC 500. *Seminar.* ♦1 (1s-0).

H EC 502. *Research Project in Nutrition.* ♦3 (3L).

H EC 503. *Further Research Project in Nutrition.* ♦3 (3L).

## 94.11 / *Microbiology*

MICRB 201. *Elementary Microbiology.* ♦3 (3-3). An introduction to the microbial world, with emphasis on general characteristics of bacterial growth and fundamentals of classification. Note: Offered to students in Agriculture and Household Economics, and as a Natural Science option to students in Arts. Not available to students in Science.

## 94.12 / *Physical Education*

PHYS ED 218. *Activity Course—Men.* ♦0 (0-2). Tests in fitness and aquatics in the First Term, followed by student-selected recreational activities. Note: Course required of all first-year men.

PHYS ED 228. *Activity Course—Women.* ♦0 (0-2). Foundations of Physical Education with emphasis on fitness, followed by two electives in recreational activities: Note: Course required of all first-year women.

## 94.13 / *Physiology*

PHYSL 261. *Introductory Physiology.* ♦6 (3-3). Lectures: essentials of human physiology. Laboratories: experience in handling living tissues and in certain basic physiological techniques. Prerequisites: Biology 30, 130, or 230; Anatomy 200.

# *Faculty of Law*

## 101 / INTRODUCTORY

### 101.1 / *Members of the Faculty*

#### 101.1.1 / STAFF

*Honorary Professors*
The Honourable R. MARTLAND
G. H. STEER, Q.C.

*Professors*
I. L. HEAD, LL.M.
A. SMITH, Q.C., J.S.D.
W. A. STEVENSON, LL.B.
A. R. THOMPSON, J.S.D. (Acting Dean)

*Associate Professors*
D. T. ANDERSON, B.C.L.
(Miss) P. J. COFFMAN, M.A., LL.M. (Law Librarian)
F. D. JONES, LL.M.
E. W. S. KANE, LL.B. (Faculty Secretary)
S. P. KHETARPAL, Ph.D.

*Assistant Professors*
B. M. BARKER, LL.B.
G. R. BRETTEN, LL.B.
T. CHEN, M.C.L., LL.M.
P. L. FREEMAN, LL.B.
F. LAUX, LL.B.
M. J. SYCHUK, M.C.L.
J. S. WILLIAMS, B.C.L.

*Sessional Instructors*
J. BRUMLIK, LL.B.
P. L. HERRING, LL.B.
D. C. McDONALD, B.C.L.
A. F. MOIR, Q.C., LL.M.
J. RITCHIE, LL.B.

#### 101.1.2 / ADDITIONAL MEMBERS OF THE FACULTY COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Director, Institute of Legal Research and Reform*
W. F. BOWKER, Q.C., LL.M.

*Representative*
A. F. MOIR, Q.C., LL.M. (Law Society of Alberta)

*Registrar of the University*
A. D. CAIRNS, B.A.

### 101.2 / *General Information*

The Faculty of Law of The University of Alberta offers a program designed to qualify a student for the practice of law in any jurisdiction in which the Common Law prevails. It is also designed to provide training for business and government administration. The program requires full-time attendance for three academic years, and leads to the degree of Bachelor of Laws (LL.B.).

A graduate of the Faculty of Law who wishes to enter upon the practice of law must meet the requirements of the jurisdiction in which he desires to practise. The Province of Alberta requires the resident student graduate to article with a practising member of the Bar and serve under him for one year; at the end of this period and upon fulfilling certain other conditions he is formally admitted by a judge of the Supreme Court to the practice of Law in this province.

Holders of an LL.B. degree or its equivalent from this or some other university who also meet the requirements for admission to the Faculty of Graduate Studies in other respects may be admitted to a program of study in the Faculty of Law leading to the degree of Master of Laws (LL.M.). The regulations for this program, and the general regulations for graduate studies, are set out in the Graduate Studies section of the Calendar (§§ 201-204).

The Law Library has a collection of approximately 42,000 volumes. Included in this collection are all major Canadian, English, and U.S. law reports, Canadian, major British, and a substantial number of U.S. statutes and a textbook collection of approximately 9,000 volumes. In addition some 470 legal periodicals are currently received annually.

Students in the Faculty have the opportunity to prepare and submit articles for inclusion in the *Alberta Law Review*. The *Review*, published annually by an editorial board of students advised by members of the Faculty, circulates widely among

members of the profession in Alberta and in other provinces and abroad.

Prospective Law students are invited to consult the Dean of the Faculty for advice as to the selection of options or on any other academic problem.

# 102 / FACULTY REGULATIONS

## 102.1 / *Admission*

### 102.1.1 / ADMISSION REQUIREMENTS

The entrance requirement of the Faculty of Law is either (1) the degree of B.A. or an equivalent degree as accepted by the Faculty Committee on Admissions, or (2) the completion of two years of the combined B.A., LL.B. program as offered by The University of Alberta or The University of Calgary.

The matriculation requirements for the combined B.A., LL.B. program are set out in §§ 13.1 and 13.3.3 of the University Regulations section of the Calendar.

### 102.1.2 / APPLICATION PROCEDURE

Students planning to enter first year Law, excluding those in the combined B.A., LL.B. program, should apply for admission on or before July 1 whether they have previously attended this University or not. Where possible they should also arrange for a personal interview with the Dean of the Faculty or Faculty Secretary before that date.

Students who have successfully completed the second year of the combined program need not make application. They will receive from the Faculty of Law a letter confirming their eligibility to enter first year of Law.

An applicant holding a B.A. or equivalent degree is not automatically entitled to admission to the Faculty of Law.

The whole record of each applicant is examined by a Committee of the Law Faculty Council which has power to decide whether he shall be admitted. One of the grounds for refusing admission is an academic record of the applicant considered unsatisfactory by the Committee.

## 102.2 / *Academic Standings*

(1) *Grading.* Subject to exceptions approved by the Law Faculty Council, a final examination comprising 100 per cent of the grade shall be held in each required course in any year. Subject to the approval of the Dean, in all other courses grading may be with or without a final examination, and a percentage of the grade may be assigned by the instructor to performance in class, term papers, examinations and other assignments. Early in the session, the instructor will announce to the class the basis on which grades are to be assigned.

(2) *Absence.* If a student has an unexcused absence from a term examination or an unexcused failure to submit a term paper or to perform any other required assignment, the grade assigned to him for the term examination, term paper, or other required assignment shall be zero. However, in case of illness or other extreme circumstance, the student may be excused from writing the term examination or submitting the term paper or performing the required assignment. To be excused a student must present to his instructor an absence slip signed by the Infirmary Physician, where illness is the cause, or by the Registrar, where the cause is other than illness. When the excuse is accepted, the percentage weight allotted to the term examination, term paper, or required assignment will be added to the percentage weight allotted to the final examination. (For regulations governing absence from a final examination see § 16.2.2 of the University Regulations section of the Calendar.)

(3) *Pass mark.* The pass mark in each subject is a grade of 4, except where otherwise specified.

(4) *Required average.* A student in each of the three years in Law is required to obtain a grade-point average of 5.0 on the whole of the work of the year.

(5) *Supplemental privilege.* In a course where there is no final examination, no supplemental privilege can be granted. The student is warned that in this case the failure to obtain the pass mark in the course will result in his being required to repeat the whole of the work of the year.

(6) *Failure in particular courses.* A student who obtains the required grade-point average, but who fails to obtain the pass mark in all subjects in the year and who fails to pass supplemental examinations, if any, will, if permission is given, be required to repeat the year failed.

(7) *Failure to obtain required average.* A student who fails to obtain the required grade-point average in any year shall not be entitled either to be promoted or to repeat the year failed. In exceptional cases,

the Faculty Council may give permission to the student to repeat the year failed; the student shall be required to pass all subjects and to obtain a grade-point average of 5.5 on the whole of the work of the year being repeated. In no case shall a student be allowed to take more advanced work before repeating the year failed.

(8) *Viva voce examination.* All students seeking the degree of LL.B. may be required by the Faculty to pass a viva voce examination at the end of their last year. Such an examination would be of general character covering the work of the three years of the Law program.

NOTE A: In the case of a student adversely affected by these regulations, the Faculty Council takes into consideration all circumstances within its knowledge which might justify any deviation from the regulations.

NOTE B: A student in the first or second year of the combined B.A., LL.B. program is under the jurisdiction of the Faculty of Arts. In his third year (the first year of Law) the student is primarily under the jurisdiction of the Faculty of Law but remains under the partial jurisdiction of the Faculty of Arts. Students in the combined program who are under the jurisdiction of the Faculty of Arts are referred to the Faculty of Arts section of the Calendar for the academic regulations which apply to them. See also § 103.2, below.

# 103 / PROGRAMS OF STUDY

## 103.1 / *The Degree of Bachelor of Laws*

Students in the three-year program for the degree of LL.B. are required to take the courses listed in § 104, below, as first, second, and third year courses. In their second and third years they will enrol in optional courses in the numbers and terms indicated. In admitting students to optional courses, consideration will be given to their preferences, but allocations will be made in such a way as to avoid large classes.

All students in the first and second years will take part in a moot court argument. All students in the third year will participate as judges in first-year moots.

## 103.2 / *Combined Program for the Degrees of B.A., LL.B.*

A five-year program leading to the degrees of B.A., LL.B. is offered co-operatively by the Faculties of Arts and Law.

In the first two years of the program, students register in the Faculty of Arts; in the remainder of the program, in the Faculty of Law.

The outline of the program is as follows:

*First year*: English 200; French 200 or 205, or German 200, or Latin 200; a Science or Mathematics or Statistics course; two of Economics 200, History 200, Philosophy 240, or Political Science 200; Physical Education.

*Second year*: Five approved Arts courses, subject to the regulations in (2), and (3), and (4) below.

*Third year*: The prescription for first-year Law; one senior Arts course.

*Fourth year*: The prescription for second-year Law.

*Fifth year*: The prescription for third-year Law.

The program is subject to the following regulations:

(1) Matriculation requirements are the same as for the B.A. program, but with an average of at least 65 per cent required. See § 13.3 of the University Regulations section of the Calendar.

(2) The courses of the first two years of the program must include a major concentration of three courses in one of Economics, English, History, Philosophy, or Political Science, and a minor concentration of two courses in a second subject, not necessarily one of these.

(3) The program must include at least one approved course in either Canadian History or Canadian Government, and at least one approved course in British Constitutional History or British Government; these courses may, but need not, be included in either the major or the minor concentration.

(4) All Arts options require the approval of the Chairman of the Inter-Faculty B.A., LL.B. Committee.

(5) To be promoted from the first to the second year, a student must have successfully completed all courses in the first year with a grade-point average of at least 5.0.

(6) To be promoted from the second to the third year, a student must have successfully completed all courses in the second year with a grade-point average of at least 5.0, and must have attained a grade of 6 or better in at least four courses, two of which must be in the second year.

(7) The degree of B.A. may be awarded at the end of the fourth year.

## 103.3 / *Graduate Studies*

### 103.3.1 / THE DEGREE OF LL.M.

(1) The Faculty of Law offers a program of graduate study leading to the degree of Master of Laws.

(2) Applicants for this program should hold the degree of LL.B. or its equivalent from this or some other university, and must meet the general requirements for admission to the Faculty of Graduate Studies.

(3) The program normally requires attendance at courses four hours a week for two terms, and the submission and defence of a thesis. Courses are available only in specialized fields. All programs must be approved by the Dean of the Faculty.

(4) Inquiries regarding programs, courses, and financial assistance should be made to the Dean of the Faculty.

### 103.3.2 / THE DIPLOMA IN PETROLEUM LAW

The Faculty of Law is authorized to award a Diploma in Petroleum Law. Admission to the diploma program is available to those qualified in law by universities, institutions of learning or professional societies in any part of the world, whose qualifications are approved by the Faculty. In particular, the diploma program is available to graduates in the civil law or in other systems of law whose backgrounds do not qualify them for the Master of Laws degree. A working knowledge of the English language is required. The program of studies includes courses in petroleum law and related fields, together with research, as approved by the Faculty of Law. In addition, a thesis may be required or not, depending on the Faculty's assessment of the candidate's qualifications. The awarding of the diploma depends on the completion of all requirements to the satisfaction of the Faculty of Law.

# 104 / DETAILS OF COURSES

## 104.1 / *General Information*

In the following list, courses included in Law programs are grouped according to the year of the program in which they are to be taken.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Following the title of the course is the symbol "♦", standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours, respectively, required by the course in a week. Where they appear, the symbol "s" denotes seminar hours and the symbol "L" denotes combined lecture-laboratory hours. The hours of instruction for a full course are the same in both terms unless otherwise indicated. If the course is a half-course, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the Faculty of Law.

## 104.2 / *First-Year Courses*

LAW 400. *Introductory Course.* ♦3 (First Term, 3-0). An introduction to the nature and historical development of common law, from early times to the present day. A study will be made of English and Canadian court systems, as well as various forms of actions, doctrines of precedent, and statutory construction. In addition, the student will be instructed in research and given a series of legal research problems as required assignments.

LAW 401. *Contracts.* ♦6 (3-0). Formation of contract. Intention to create legal obligations. Certainty or ascertainability of terms. Offer and Acceptance. Extent to which acceptor bound by conditions of which he is not aware. Genuineness or reality of consent. Consideration. Parties. Impossibility of performance. Discharge of contract. Milner, *Cases and Materials on Contracts;* Cheshire and Fifoot, *Cases on the Law of Contract;* Anson, *Principles of English Law of Contract;* Cheshire and Fifoot, *The Law of Contract.*

LAW 402. *Torts.* ♦6 (3-0). Intentional interference with the person and with land and chattels; the defences thereto; contributory negligence and assumption of risk; death in relation to tortious liability; liability of occupiers of land; liability for damage caused by animals; strict liability; deceit; interference with advantageous relations; and the law of master and servant with particular reference to the law of torts. Wright, *Cases on the Law of Torts,* 1967; selected readings.

LAW 403. *Property I.* ♦4 (2-0). (a) Real Property. The historical background of land in Alberta; in particular, tenure and estates, future interests, concurrent interests, dower rights, and incorporeal interests. The Torrens system is related to the land law by a general introduction to the subject of land registration. Cheshire, *Modern Real Property;* Megarry and Wade, *Law of Real Property;* Laskin, *Cases and Notes on Land Law.* (b) Personal Property. The nature of chattels and the means by which a property interest in them may be acquired, retained, modified, and severed. Crossley Vaines, *Personal Property;* selected cases and readings.

LAW 404. *Criminal Law.* ♦4 (2-0). General introduction to Criminal Law dealing with principles of criminal liability, common defences to criminal charges, and selected specific offences.

LAW 405. *Agency.* ♦2 (Second Term, 2-0). The relationship of Principal and Agent. Capacity of parties. Appointment of agents. Married women as agents of their husbands. Delegation. Agents binding their Principals; actual authority; Ostensible Authority and holding out; contracts under Seal executed by Agents. Ratification. Undisclosed Principals. Duties of Agent to Principal. Duties of Principal to Agent. Determination of agent. Partnership. Wright, *Cases on Agency;* Powell, *The Law of Agency;* Fridman, *The Law of Agency.*

## 104.3 / *Second-Year Courses*

### 104.3.1 / REQUIRED COURSES

LAW 432. *Commercial Law.* ♦6 (3-0). Bills and notes and sales of goods, studied intensively on the basis of the statutes, cases, and texts. The case law concerning bills of sale, chattel mortgages, and conditional sale contracts. Creditors' rights under particular statutes, including the Bankruptcy Act, with emphasis upon setting aside fraudulent conveyances, executions, seizures, and suretyship. Falconbridge, *Banking and Bills of Exchange; Benjamin on Sale;* Chalmers, *Sales of Goods,* Atiyah, *Sale of Goods.*

LAW 434. *Wills and Administration.* ♦3 (Second Term, 3-0). Principles of the Wills Act, including formalities of execution, revocation, revival, republication, types of legacies, and principles of construction. Testamentary capacity, fraud, and undue influence. Drafting of wills. Appointment of executors and administrators, their powers and duties; probate practice. Theobald, *Wills* (eleventh edition); Jarman, *Wills* (eighth edition); Bailey, *Wills* (third edition); Mustoe, *Executors* (fourth edition); Widdifield, *Executors' Accounts.*

LAW 435. *Canadian Constitutional Law.* ♦4 (2-0). Principles applicable to proceedings by and against the Crown and its agencies, including declaratory judgments. The British North America Act, particularly the division of legislative jurisdiction between Parliament and the Legislatures. Relevant comparisons with the Constitution of the United States. *The British North America Act;* selected cases and statutes; Laskin, *Canadian Constitutional Law;* Varcoe, *Legislative Power in Canada;* Smith, *The Commerce Power in Canada and the United States.*

LAW 438. *Administrative Law.* ♦3 (First Term, 3-0). Designed to provide a practical appreciation of the administrative process in relation to its judicial counterpart. Delegation of legislative powers, characterization of function, judicial review and remedies, natural justice, and the procedure before boards and tribunals. Smith, *Judicial Review of Administrative Action* (1959); Huberman, *Cases and Materials on Administrative Law.*

LAW 464. *Company Law.* ♦4 (2-0). The law of partnerships, unincorporated associations, and limited liability companies. The incorporation of companies; relationships between the company and outsiders; and relationships of the members of the company within the corporate structure. Gower, *Modern Company Law;* selected cases and readings.

LAW 476. *Taxation.* ♦4 (2-0). The scope and purpose of taxation. The taxing power; constitutional problems. Personal jurisdiction. Property jurisdiction. Income from a business; statutory interpretation, deductions, expenses. Gift tax. Problems of death duty legislation. *The Income Tax Act*; *The Estate Tax Act.*

ACCTG 270. *Legal Accounting.* ♦3 (Second Term, 3-0). (a) Introduction to the principles and mechanics of accounting as required by the Law Society of Alberta. Double entry bookkeeping principles, general maintenance of books for law offices, maintenance of books for recording of trust funds, control of disbursement of funds, and preparation of income and expense statements and balance sheets. (b) Examination of the application of accounting principles in the various areas of income taxation, company and municipal law, management of estates, bankruptcy, and winding-up procedures.

### 104.3.2 / OPTIONAL COURSES

A number of courses will be offered as options. Each second-year student will enrol in one of these courses in each term. Consideration will be given to the student's preferences but allocation will be made to avoid large classes.

*First Term*

LAW 439. *Criminology.* ♦2 (First Term, 2-0). Historical, social, constitutional, mental, and administrative aspects of crime and correction.

LAW 440. *Basic Oil and Gas Law.* ♦2 (First Term, 2-0). The origin, occurrence, and production of oil and gas; the nature of interests in oil and gas; the acquisition and disposition of interests in oil and gas; the rights and duties of parties under oil and gas leases; pooling of oil and gas interests; acquisition of surface leases and pipeline easements. References: Lewis and Thompson, *Canadian Oil and Gas;* Williams and Myers, *Oil and Gas Law;* selected readings and cases; related statutes.

LAW 441. *International Law.* ♦2 (First Term, 2-0). The sources of international law and its application in the relations of States. Principles of territory, nationality, trade and international obligations, with emphasis on those characteristics peculiar to Canadian geography, history, governmental structure, and external relationships. References: Brierly, *The Law of Nations* (sixth edition); Castel, *International Law.*

LAW 443. *Seminar in Comparative Law.* ♦2 (First Term, 2-0). A comparison of civil law and common law systems, with the Quebec example serving as the focal point for discussion and examination. The seminar concerns itself with particular illustrations from which to draw general conclusions. Its object is to broaden the common law horizon by providing an insight into the workings of the civil law. Castel, *The Civil Law System of the Province of Quebec.*

LAW 473. *Seminar on Civil Liberties.* ♦2 (First Term, 2-0). Basic rights and liberties; freedom of speech, press, and assemblies; freedom of

religion; due process of law and related procedural safeguards; safeguards against confiscation; equal protection of the law and anti-discrimination statutes. The methods for the better securing of these rights and the problem of balancing, including some comparisons of the law and constitution of Canada and the United States.

*Second Term*

LAW 433. *Insurance Law.* ♦2 (Second Term, 2-0). General principles affecting insurance contracts including good faith, indemnity, subrogation, and insurable interest; particular problems arising out of the Alberta Insurance Act in relation to automobile, life, and fire insurance. U.B.C. *Cases and Materials on the Law of Insurance; The Alberta Insurance Act.*

LAW 442. *Seminar in International Law Problems.* ♦2 (Second Term, 2-0). A research seminar dealing in depth with a problem in international law (the specific topic will be announced each year). Designed to train students in the use and evaluation of international legal materials. A paper will be required of each student. Prerequisite: Previous study of international law.

LAW 472. *Advocacy.* ♦2 (Second Term, 2-0). Counsel's conduct of litigation; emphasis on written and oral arguments; factums; the preparation and conduct of trial and appellate litigation; the duty of counsel; the techniques of advocacy. Note: Enrolment will be limited, with preference given to those students eligible in second-year Law for final competition in moot court program.

LAW 495. *Seminar in Labor Law.* ♦2 (Second Term, 2-0). Legal problems concerning the establishment of collective bargaining; negotiation and enforcement of the collective agreement; the activities of the union and employers in industrial disputes; and the internal affairs of labor organizations. A. W. R. Carrothers, *Bargaining Law in Canada.*

LAW 496. *Seminar in Land Use Planning Law.* ♦2 (Second Term, 2-0). The law of Land Use Planning with particular reference to the law of the Province of Alberta, including: duties and functions of planning agencies, land use control, judicial regulation of land use control, urban renewal, effect of planning on land values and expropriation.

LAW 498. *Natural Resources Law.* ♦2 (Second Term, 2-0). The judicial, legislative, and administrative problems related to the regulation and management of natural resources, including problems of allocation, development, use, pollution control, and conservation. Particular emphasis on environmental resources such as water and air.

## 104.4 / *Third-Year Courses*

### 104.4.1 / REQUIRED COURSES

LAW 406. *Criminal Procedure.* ♦2 (Second Term, 2.0). A general of the basic procedures to be followed in the administration of criminal justice in Canada.

LAW 430. *Evidence.* ♦4 (2-0). The adversary system in trial and appellate courts; relevance and admissibility; character evidence including similar facts; opinion evidence; the hearsay rule and its exceptions; illegally obtained evidence; judicial notice; burdens of proof and presumptions; quantum of proof; corroboration; competence, compellability and privilege; parole evidence rule; oaths and affirmations. Morton, *Cases and Materials on Evidence;* Cross, *Evidence;* selected readings.

LAW 431. *Trusts.* ♦3 (First Term, 3-0). A brief survey of the historical development of the trust; intensive study of the specialized areas of this institution. Particular attention to the intricacies of charitable trusts and the following of trust assets. Weston, *Cases and Materials on Wills and Trusts* (1957); Keeton, *Law of Trust* (seventh edition, 1957).

LAW 436. *Domestic Relations.* ♦2 (Second Term, 2-0). Promise to marry and breach thereof. Marriage as a contract. Marriage as a status. Presumption of valid marriage. Void and voidable marriages; minors; mental incapacity, mistakes, duress; degrees of affinity and consanguinity; impotency. Divorce. Judicial separation. Cruelty. Condonation. Collusion. Smith and Guttman, *Cases and Materials on Domestic Relations.*

LAW 460. *Real Property II.* ♦4 (2-0). (a) The law relating to land titles. Thompson, *Cases and Notes on Land Titles;* Thom, *Canadian Torens System.* (b) The law governing agreements for sale of land; the open contract of sale, implied terms; special covenants in agreements for sale. Remedies of vendors and purchasers; election of remedies; cancellation and determination clauses. Deposits and instalments. Mortgages: legal, equitable, and statutory. Foreclosure; sales; redemption; possession and attornment. McCaul, *Remedies of Vendors and Purchasers;* Falconbridge, *Law of Mortgages.*

LAW 461. *Equity.* ♦2 (First Term, 2-0). Historical introduction. Nature of equitable rights. Bona fide purchaser for value without notice; *Qui prior est tempore potior est jure,* and the rule in Dearle v. Hall; doctrines of conversion, election, performance, ademption, and satisfaction. Mistake, misrepresentation, fraud, and specific performance. Smith and Read, *Cases on Equity;* Maitland, *Equity;* Hanbury, *Modern Equity;* Snell, *Principles of Equity.*

LAW 462. *Practice.* ♦4 (2-0). The fundamentals of judicial procedure; the jurisdiction of the courts, and the process of the courts. Clinical sessions and observation in court of the several forms of judicial hearings. Rules of Court.

LAW 463. *Recent Cases and Legislation.* ♦4 (1-0). Students are given a series of practical problems, usually involving statute law as well as case law, and are required to give an opinion or write a brief. Stress is laid on the techniques of research and of writing; certain recent cases are critically examined, and relevant statutes are studied from the standpoint of statutory construction as well as content. Each student is required to write a case comment on a recent Canadian case.

LAW 466. *Jurisprudence.* ♦3 (First Term, 3-0). The philosophy of law, including natural law theory, legal positivism, sociological jurisprudence, and American legal realism. Particular jurisprudential topics considered include the nature and purpose of law, the relationship of justice to both the content and process of law, the role of law and lawyers in modern society, the judicial process, and the relationship of law and morality. References: Stone, *Social Dimensions of Law and Justice;* Patterson, *Jurisprudence;* Pound, *An Introduction to the Philosophy of Law;* Cardozo, *The Nature of the Judicial Process;* Hart, *Law, Liberty and Morality.*

## 104.4.2 / OPTIONAL COURSES

A number of courses will be offered as options. Each third-year student will enrol in one of these courses in the First Term and two of these courses in the Second Term. Consideration will be given to the student's preferences but allocation will be made to avoid large classes.

### *First Term*

LAW 439. *Criminology.* ♦2 (First Term, 2-0).

LAW 440. *Basic Oil and Gas Law.* ♦2 (First Term, 2-0).

LAW 441. *International Law.* ♦2 (First Term, 2-0).

LAW 443. *Seminar in Comparative Law.* ♦2 (First Term, 2-0).

LAW 465. *Conflict of Laws.* ♦2 (First Term, 2-0). Characterization. Domicile. Choice of law; penal, revenue, and procedural law; public policy, Marriage: form, capacity; succession, movables, immovables; restrictions on power of testamentary disposition; revocation of a will by subsequent marriage; proprietary rights of spouses; legitimacy; *legitimatio per subsequens matrimonium;* adoption of infants; torts; contract. The doctrine of the renvoi. Jurisdiction: general; divorce; nullity of marriage; custody of infants. Castel, *Cases of the Conflict of Law;* Falconbridge, *Cases on the Conflict of Laws;* Morris, *Cases on Private International Law;* Dicey, *The Conflict of Laws;* Cheshire, *Private International Law;* Falconbridge, *Essays on the Conflict of Laws;* Castel, *Private International Law;* Graveson, *The Conflict of Laws;* Wolff, *Private International Law.*

LAW 473. *Seminar on Civil Liberties.* ♦2 (First Term, 2-0).

LAW 493. *Seminar in Estate Planning.* ♦2 (First Term, 2-0). Arrangements for the disposition of accumulated wealth during life and at death. The impact of income, estate and gift taxes in shaping the form of dispositions, the functions of life insurance in the family and business arrangements, and the significance of variations in the disposer's family and business circumstances and in the nature and value of his assets.

LAW 497. *Seminar in the Regulation of the Petroleum Industry.* ♦2 (First Term, 2-0). The acquisition of Petroleum Interests from the Crown; the terms of operating and development agreements; conservation legislation and practices including unitization and pro-rationing; the regulation of the natural gas industry; the pipelining and marketing of petroleum products. **Prerequisite: Law 440.**

### *Second Term*

LAW 433. *Insurance Law.* ♦2 (Second Term, 2-0).

LAW 442. *Seminar in International Law Problems.* ♦2 (Second Term, 2-0). See description in § 104.3.2.

LAW 470. *Corporate Finance.* ♦2 (Second Term, 2-0). An examination of the laws respecting the financing of public companies, including the preparation of the prospectus and the role of Securities Commissions. Attention given to such concepts as the debenture trust deed. Prerequisite: Law 464.

LAW 471. *Advanced Taxation.* ♦2 (Second Term, 2-9). The tax consequences of corporation financing: amalgamations, mergers, international business transactions; tax planning from a corporation and personal standpoint; the use of "off-shore" companies; and trends in taxation. Prerequisite: Law 476.

LAW 472. *Advocacy.* ♦2 (Second Term, 2-0).

LAW 495. *Seminar in Labor Law.* ♦2 (Second Term, 2-0).

LAW 496. *Seminar in Land Use Planning Law.* ♦2 (Second Term, 2-0).

LAW 498. *Natural Resource Law.* ♦2 (Second Term, 2-0).

## 104.5 / *Graduate Courses*

LAW 442. *Seminar in International Law Problems.* ♦2 (Second Term, 2-0).

LAW 443. *Seminar in Comparative Law.* ♦2 (Second Term, 2-0).

LAW 473. *Seminar in Civil Liberties.* ♦2 (Second Term, 2-0)..

LAW 497. *Seminar in the Regulation of the Petroleum Industry.* ♦2 (Second Term, 2-0).

LAW 498. *Natural Resource Law.* ♦2 (Second Term, 2-0).

LAW 590. *Seminar in Advanced Problems in Constitutional Law.* ♦4 (2-0). Designed to enable and require the participants to conduct intensive, specialized studies in topics in Canadian Constitutional Law which have current or future significance but which are either not treated or, if treated, not emphasized in the subject in the second year. Each participant, during the Session, will prepare, deliver, and defend a major paper on a topic chosen by him and approved by the instructor.

LAW 601. *Seminar in Comparative Petroleum Legislation.* ♦4 (2-0). A comparative study of the legislative framework regulating the development of petroleum resources in various parts of the world. Particular attention to the role of legislation in the granting of exploration and development rights in state-owned land, in stimulating production, in maximizing revenues, in minimizing interference with state sovereignty, in conserving oil and gas resources, and in regulating the multiple use of surface land.

UNIVERSITY OF ALBERTA
QUAECUMQUE VERA

*Miss Sarah R. Reed, Director of the School of Library Science.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# School of Library Science

## 111 / INTRODUCTORY

### 111.1 / *Members of the School of Library Science*

#### 111.1.1 / STAFF

*Professor and Director*
(Miss) S. R. REED, B.L.S., M.A.

*Visiting Professors*
(Miss) H. M. FOCKE, M.A., B.S. in L.S.
F. G. B. HUTCHING, M.A., F.L.A.

*Associate Professors*
D. W. FOLEY, B.L.S., A.M.L.S.
G. S. PANNU, B.L.S., M.L.S.
J. G. WRIGHT, B.Ed., M.L.S.

#### 111.1.2 / ADDITIONAL MEMBERS OF THE SCHOOL COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Associate Deans*
H. KREISEL, Ph.D. (Graduate Studies)
W. D. NEAL, Ed.D. (Education)

*Librarian to the University*
B. B. PEEL, M.A., B.L.S.

*Professors*
H. J. BRODIE, Ph.D. (Botany)
D. B. SCOTT, Ph.D. (Computing Science)
L. H. THOMAS, Ph.D. (History)

*Representative*
(Miss) P. LAPWORTH, B.A., B.L.S. (Alberta Library Association)

*Registrar of the University*
A. D. CAIRNS, B.A.

### 111.2 / *General Information*

The School of Library Science offers the first post-baccalaureate program in Library Science in the Prairie Provinces, culminating in a B.L.S. degree. The School's curriculum is designed to meet the needs of those seeking professional positions in public, academic, school, and special libraries.

The first of three phases in the program is an orientation in the world of librarianship to afford students a common background. Phase two is a series of First-Term courses which will explain the philosophy, principles, practices, techniques and materials of librarianship. Phase three deals with particular types of librarianship.

During this one-year program of pre-service professional education the student will be expected: (1) to achieve an understanding of the fundamentals of librarianship; (2) to develop a scholarly, critical, and scientific attitude toward librarianship and library problems; (3) to acquaint himself with library literature, appropriate research methodologies, and the state of the library art; and (4) to gain a sense of participation in the dynamic, creative world of librarianship.

## 112 / SCHOOL REGULATIONS

### 112.1 / *Admission*

#### 112.1.1 / ADMISSION REQUIREMENTS

(1) The applicant must have a Bachelor's degree from a recognized institution of higher learning, with academic standing acceptable to the School of Library Science.

(2) In preparing for a Bachelor of Library Science degree program, students are advised to include courses distributed among the social sciences, biological and physical sciences, literature and other areas of the humanities, and also a major in one of these subjects. Course work in undergraduate library science may not exceed one-third of the total professional program in library science.

(3) Since there is a quota on the number of students in the School of Library Science, The University of Alberta cannot guarantee admission to the School for all fully qualified applicants. In some instances the University is prepared to admit students who

have achieved high records on the Graduate Record Examination Aptitude Tests.

(4) The applicant must present evidence of reading knowledge of a modern language other than English. Reading knowledge is assumed if a student has completed French 200, German 200, Russian 300, or, at an equivalent level, any other modern language acceptable to the School of Library Science. Otherwise reading knowledge may be demonstrated by obtaining satisfactory standing on a proficiency examination. French, German, and Russian are particularly useful in bibliographic work.

(5) A foreign applicant whose native language is not English must provide evidence of proficiency in English by taking an English language examination for foreign students administered by (a) the University of Cambridge, Cambridge, England; or by (b) Testing and Certification Division, English Language Institute, University of Michigan, Ann Arbor, Michigan; or by (c) Educational Testing Service, Box 593, Princeton, New Jersey, 08540, *or* Box 1025, Berkeley, California, 94701. He should arrange for the testing agency to report his results to the School of Library Science which will judge whether or not they are satisfactory.

(6) Applicants are judged not only upon their academic record but also by their professional promise as indicated in a personal interview and in three letters of reference. The University will arrange such interviews at a time and place convenient to the applicant. Applicants will submit the names of three referees. The School of Library Science will request the letters of reference.

(7) An applicant who has not had library experience is strongly advised to work in a library under professional supervision before registration. Such experience tests a candidate's aptitude for library work and gives some knowledge of library terminology and processes.

(8) Since much use is made of the typewriter, the ability to type will be to the student's advantage.

### 112.1.2 / APPLICATION FOR ADMISSION

An applicant must obtain application forms and submit an application to the Director of the School of Library Science before the closing date of May 15, in order to provide time for interviews, testing procedures, and early student registration.

An applicant who is a graduate of The University of Alberta is required to complete a School of Library Science Application for Admission and an Application for Re-enrolment.

An applicant other than a graduate of The University of Alberta must arrange for the Registrar of the university which he attended to send an official transcript of his academic record to the Registrar of The University of Alberta. With his application he must remit visé fees as follows: $5.00 for the evaluation of documents issued by Canadian educational institutions outside Alberta; $10.00 for those issued outside Canada. He must also complete and submit both the School of Library Science Application for Admission and the undergraduate Application for Admission.

Each applicant, when notified that his application has been accepted, shall pay a *deposit in the amount of $25.00* to The University of Alberta, which amount will later be applied on his fees if he registers, or be forfeited in full if he fails to register (except for grave cause).

## 112.2 / *Registration*

Registration is scheduled for 9:00 the first morning of the orientation session. Further particulars will be provided when a student is officially admitted to the School.

## 112.3 / *Academic Standing*

To qualify for the B.L.S. degree, a student must obtain a grade-point average of not less than 6 on the work of the year. A student whose overall performance is deemed to be unsatisfactory by the Council of the School of Library Science may be required to withdraw.

# 113 / PROGRAMS OF STUDY

## 113.1 / *The Degree of B.L.S.*

The School of Library Science offers a one-year program for university graduates leading to the degree of Bachelor of Library Science (B.L.S.).

This is a full-time professional program. In addition to fifteen hours a week of lectures, a student must expect to devote considerable time to assignments, laboratories, papers, and reading. It is estimated that about three hours of study are required for each hour of lectures.

*Orientation.* All students are required to take Library Science 400, a four-week orientation period prior to the beginning of the First Term of the Winter Session.

*First Term.* Library Science 400 (Colloquium), 401, 402, 403, 404, 405, and 407, and one of the following courses: Library Science 409, 411, 413, 415, 417, or 419, or an approved option from a related field.

*Second Term.* Library Science 400 (Colloquium), 402, and 404; one of Library Science 421, 423, 425, 427, or 429; and three of Library Science 409, 411, 413, 415, 417, 419, 431, 433, 435, 437, and 439, or approved options from related fields.

# 114 / DETAILS OF COURSES

## 114.1 / *General Information*

In the following list of courses, each course is designated by the computer abbreviation for Library Science and its number. This abbreviation and number should be used by the student when filling in his registration forms.

Following the title of the course is the symbol "♦", standing for "course weight", and a number indicating the weight of the course as used in calculating grade-point averages.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours (or seminar hours, marked with an "s") required by the course in a week. If the course is a half-course, the term in which it is offered is mentioned.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors concerned, and all further details must be sought from the School of Library Science.

## 114.2 / *Required Courses*

LIB S 400. *Orientation and Colloquium.* ♦ none (four weeks prior to the opening of the Session; 1-0 during the Session).

LIB S 401. *The Library in Society.* ♦ 2 (First Term, 2-0).

LIB S 402. *Cataloguing and Classification.* ♦ 6 (6L).

LIB S 403. *Building Library Collections.* ♦ 2 (First Term, 2-0).

LIB S 404. *Reference Sources.* ♦ 6 (3-3).

LIB S 405. *Library Administration and Management.* ♦ 2 (First Term, 2-0).

LIB S 407. *Research Methods.* ♦ 1 (either term, 1-0).

## 114.3 / *The Organization, Administration, and Management of Libraries*

LIB S 421. *Academic Libraries.* ♦ 3 (Second Term, 3-0).

LIB S 423. *Public Libraries.* ♦ 3 (Second Term, 3-0).

LIB S 425. *School Libraries.* ♦ 3 (Second Term, 3-0). Prerequisite: a teaching certificate.

LIB S 427. *Work with Children and Young People in Public Libraries.* ♦ 3 (Second Term, 3-0).

LIB S 429. *Special Libraries.* ♦ 3 (Second Term, 3-0).

## 114.4 / *Elective Courses*

LIB S 409. *Automation and Libraries.* ♦ 2 (either term, 2-0).

LIB S 411. *History of Books and Libraries.* ♦ 2 (either term, 2-0).

LIB S 413. *Materials for Children.* ♦ 2 (either term, 2-0).

LIB S 415. *Storytelling.* ♦ 2 (either term, 2-0).

LIB S 417. *Materials for Young People.* ♦ 2 (either term, 2-0).

LIB S 419. *Materials for Adults.* ♦ 2 (either term, 2-0).

LIB S 431. *Library Collections in the Humanities.* ♦ 2 (Second Term, 2-0).

LIB S 433. *Library Collections in the Social Sciences.* ♦ 2 (Second Term, 2-0).

LIB S 435. *Library Collections in the Sciences and Technology.* ♦ 2 (Second Term, 2-0).

LIB S 437. *History and Theory of Classification and Cataloguing.* ♦ 2 (Second Term, 2-0).

## 114.5 / *Directed Study*

LIB S 439. *Directed Study.* Weight according to work done; maximum ♦3 (Second Term, 3-0). A student wishing to obtain a greater credit weighting for a library science option may do so in conjunction with this course. The weight of the option (♦2) together with the weight assigned to a weekly hour of directed study (♦1) will make a total of ♦3.

*Dr. W. C. MacKenzie (seated), Dean of the Faculty of Medicine, with Dr. D. F. Cameron, Associate Dean, and Dr. L. C. Grisdale, Assistant Dean.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# *Faculty of Medicine*

## 121 / INTRODUCTORY

### 121.1 / *Members of the Faculty*

#### 121.1.1 / OFFICERS OF THE FACULTY

*Dean*
W. C. MacKENZIE

*Associate Dean*
D. F. CAMERON

*Assistant Dean*
L. C. GRISDALE

*Student Affairs*
(Mrs.) O. HAGEN

*Graduate Training*
R. E. ROSSALL

*Continuing Medical Education*
A. S. LITTLE

*Research in Medical Education*
J. A. L. GILBERT

*Computer Application*
D. FENNA

*Vivarium*
D. C. SECORD

*Administration*
A. J. MAIANI

#### 121.1.2 / DEPARTMENT OF ANAESTHESIA

*Professor and Head*
E. A. GAIN

*Associate Professors*
D. F. CAMERON
J. W. R. McINTYRE

*Assistant Clinical Professors*
F. C. HALEY
N. W. NIX

*Clinical Lecturers*
R. I. McCALLA
G. T. MOONIE

*Clinical Instructors*
C. D. ELTON
J. M. HAGEN
W. D. KYLE
R. D. SCRAGG

#### 121.1.3 / DEPARTMENT OF ANATOMY

*Professor and Head*
T. S. LEESON

*Professors*
R. D. LAURENSON
W. R. SALT

*Associate Professors*
F. B. COOKSON
(Mrs.) E. O. HAGEN

*Assistant Professors*
I. HOLMES
K. D. McFADDEN

*Lecturer*
H. MELAX

*Professor Emeritus*
R. F. SHANER

#### 121.1.4 / DEPARTMENT OF BACTERIOLOGY

*Professor and Head*
F. L. JACKSON

*Professors*
J. W. CARMICHAEL
J. M. S. DIXON

*Associate Professors*
C. H. JELLARD
(Mrs.) O. MORGANTE
(Miss) S. R. TOSHACH
(Mrs.) P. C. WONG

*Assistant Professors*
F. BEL
(Mrs.) A. M. BURSEWICZ

*Lecturers*
I. W. GEERE
(Miss) Y. GOODMAN
(Mrs.) E. G. HAMPTON
A. A. PADHYE

*Sessional Lecturer*
S. I. HNATKO

#### 121.1.5 / DEPARTMENT OF BIOCHEMISTRY

*Professor and Head*
J. S. COLTER

*Professors*
J. F. HENDERSON
C. M. KAY
A. R. P. PATERSON
L. B. SMILLIE

*Associate Professors*
A. HAMPTON
N. B. MADSEN
T. NIHEI
W. PARANCHYCH
G. R. SCHONBAUM
C. J. SMITH
T. TAMAOKI
M. WATANABE

*Assistant Professors*
P. G. BARTON
W. A. BRIDGER
I. C. CALDWELL

D. J. CAMPBELL
(Miss) E. E. TOWNSEND

*Sessional Instructors*
(Miss) J. DAKIN
A. G. STEWART

*Research Associate*
(Miss) E. W. GARBUTT

*Associate Member*
R. F. RUTH

## 121.1.6 / DEPARTMENT OF COMMUNITY MEDICINE

*Professor and Head*
S. E. GREENHILL

*Assistant Professors*
(Miss) M. P. HENDRICKSON
D. LARSEN

### Preventive Medicine

*Assistant Clinical Professor*
E. S. O. SMITH

*Clinical Instructor*
(Miss) E. WYNESS

### Health Services Administration

*Associate Professor*
C. A. MEILICKE

*Assistant Clinical Professor*
B. SNELL

*Clinical Instructor*
J. READ

### Ambulatory Care Program

*Professor*
L. C. GRISDALE

*Assistant Professors*
R. R. CHERRY
E. R. HAYNES

### Preceptorship Program

*Clinical Lecturers*
K. M. L. SEGALL
D. M. WILLIAMSON

*Clinical Instructors*
A. G. BLUNDEN
G. R. BOWMAN
H. BRAND
N. CHEPEHA
M. DOLGOY
B. H. DuHEAUME
I. N. HENDERSON
C. W. HERGOTT
A. KELEMAN
J. M. LAUERMAN
J. J. LIPINSKI
L. H. LeRICHE
A. OMELCHUK
J. C. PATERSON
C. G. PENNY
A. PICHE
R. K. RAMSEY
W. J. RIDDLE
R. F. ROBERTSON
E. F. YELLE
D. R. YOUNG
H. A. LLOYD
C. G. NICHOLSON
T. B. LETTS
M. L. McMILLAN
M. MILLER
K. PAPROSKI
H. SCHWARZ
G. R. ZETTER
B. A. LOVELL
J. A. O'BRIEN

*Honorary Clinical Instructor*
P. B. ROSE

### Rehabilitation Medicine

*Professor*
J. B. REDFORD

*Associate Clinical Professor*
J. JIMINEZ

## 121.1.7 / DEPARTMENT OF MEDICINE AND CLINICAL MEDICINE

*Professor and Head*
D. R. WILSON

*Professors*
R. S. FRASER
J. A. L. GILBERT

*J. B. Collip Visiting Professor*
B. HUDSON

*Associate Professors*
S. HUNKA
A. S. LITTLE
G. MONCKTON
T. NIHEI
R. E. ROSSALL
B. J. SPROULE
M. WATANABE

*Assistant Professors*
P. M. CROCKFORD
D. M. FAWCETT
G. GOLDSAND
D. F. McFARLANE
J. S. PERCY
R. F. TAYLOR
R. A. ULAN

*Clinical Professors*
J. F. ELLIOTT
R. K. C. THOMSON

*Associate Clinical Professor*
R. H. WHITING

*Assistant Clinical Professors*
J. DVORKIN
A. M. EDWARDS
H. J. JACOBS
D. L. JUDGE
F. B. RODMAN
J. M. RYAN

*Clinical Lecturers*
T. H. AARON
G. I. BELL
A. CAIRNS
E. F. DONALD
S. E. GREENHILL
J. C. HOPKYNS
E. G. KIDD
S. KORNELL
S. J. K. LEE
C. E. LEFEBVRE
M. MATAS
C. G. RAMSEY
M. M. SEREDA
R. W. SHERBANIUK

L. SHERMAN
W. R. ST. CLAIR
H. H. STEPHENS
M. K. YOUNG
S. WEISZ

*Honorary Lecturer*
R. E. BELL

*Clinical Instructors*
D. M. BELL
W. R. BLACK
T. P. BROOME
G. D. BROWN
V. J. CAMPBELL
R. B. COGLAN
W. J. DOWNS
R. N. EIDEM
J. D. GALBRAITH
F. A. HERBERT
D. W. IRVING
M. A. JAMPOLSKY
E. L. MUTTIT
E. ROMANOWSKI
O. SCHAEFER
H. TOUPIN
C. J. VARVIS
R. H. WAIT
R. H. WENSEL

*Honorary Clinical Instructor*
W. E. POURBAIX

*Teaching Fellows*
M. I. AMINOSHARIAE
M. A. J. HACKEMANN
B. HAIDAR
Y. K. SUNG
L. N. TAKATS

*Professor Emeritus*
J. W. SCOTT

*Honorary Member*
P. H. SPRAGUE

DERMATOLOGY

*Assistant Clinical Professor*
P. L. RENTIERS

*Clinical Instructor*
J. BROWN

## 121.1.8 / DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY

*Professor and Head*
R. P. BECK

*Professor Emeritus*
J. R. VANT

*Associate Professor*
D. L. DUNLOP

*Assistant Professors*
H. J. CROOKS
J. MARKO

*Clinical Professor*
R. H. HORNER

*Associate Clinical Professors*
T. R. CLARKE
T. R. NELSON
S. S. PARLEE
D. C. RITCHIE
W. F. FERGUSON

*Assistant Clinical Professors*
L. B. BROWN
W. D. FREW
(Miss) M. M. HUTTON
D. W. J. REID
Y. YONEDA

*Clinical Lecturers*
J. S. BARR
D. M. BELL
J. A. BOYD
J. BUGIS
R. A. DAY
D. H. HUSEL
A. H. MOAWAD
E. B. QUEHL

*Clinical Instructors*
M. E. BOYD
D. M. BUCHANAN
S. W. DEVINE
F. R. DORSEY
L. J. GANS
J. R. LEEDER
R. L. McBRIDE
D. J. MOYER
R. J. OSTOLOSKY
T. TRAFF
R. W. WINTER

## 121.1.9 / DEPARTMENT OF PAEDIATRICS

*Professor and Head*
J. K. MARTIN

*Associate Professors*
P. BOWEN
G. E. EDDY
(Miss) L. A. STAYURA
A. G. STEWART
W. C. TAYLOR

*Assistant Professor*
P. F. WILCOCK

*Clinical Professors*
J. CALDER
T. A. GANDER

*Associate Clinical Professor*
N. F. DUNCAN

*Assistant Clinical Professors*
H. S. ARMSTRONG
L. E. BEAUCHAMP
L. C. GRISDALE

*Clinical Lecturers*
(Miss) J. C. NELSON
R. POIRIER
D. WILKINSON

*Clinical Instructors*
G. CONRADI
E. W. GAUK
P. J. KIMMITT
(Mrs.) C. S. LEE
M. MITCHELL
G. W. SELBY
D. R. SHEA
I. C. SINGH
A. R. STEWART
M. TEDESCHINI
S. J. TKACHYK
O. ULAN
C. T. FRIED

*Sessional Clinical Instructor*
(Miss) B. SCHMIDT

*Teaching Fellows*
(Miss) L. CALDER
A. CAMPANARO
G. M. GUPTA
E. W. M. CHOU

*Research Associate*
(Miss) B. CHERNICK

## 121.1.10 / DEPARTMENT OF PATHOLOGY

*Professor and Head*
J. W. MacGREGOR

*Professors*
G. O. BAIN
T. K. SHNITKA

*Associate Professors*
S. HANSON
T. A. KASPER
R. J. SWALLOW

*Assistant Professors*
P. W. DAVEY
M. M. SEREDA
J. H. STIRRAT
M. WEINLOS

*Assistant Clinical Professor*
M. M. CANTOR

*Lecturer*
H. W. LETTS

### Clinical Pathology

*Associate Professor and Head*
R. E. BELL

*Associate Professor*
H. E. BELL

*Assistant Professor*
D. J. CAMPBELL

*Clinical Lecturer*
D. I. BUCHANAN

*Sessional Clinical Instructors*
N. J. BALL
J. C. GODEL
(Miss) B. MOTYL

*Clinical Demonstrator*
J. R. HILL

*Teaching Fellow*
(Miss) L. JACKSON

### Neuropathology

*Associate Professor*
B. MIELKE

### Biochemistry

*Professor*
H. B. COLLIER

### Medical Laboratory Science

*Associate Clinical Professor*
H. E. BELL

*Instructors*
(Miss) C. BOODRAM
K. P. E. DIERICH
(Miss) B. A. OHASHI
(Miss) D. RACZ
(Miss) F. M. STROM
(Miss) D. J. M. YAREMA

*Sessional Instructor*
(Miss) J. DAKIN

*Sessional Demonstrators*
C. U. DUNLOP
(Mrs.) S. FREEMAN
(Mrs.) S. KNOPKE
J. LO

## 121.1.11 / DEPARTMENT OF PHARMACOLOGY

*Professor and Head*
E. E. DANIEL

*Professors*
G. B. FRANK
G. S. MARKS
C. W. NASH

*Associate Professors*
J. S. CHARNOCK
A. J. D. FRIESEN

*Assistant Professors*
(Mrs.) R. M. HENDERSON
F. INOUE
A. H. MOAWAD
D. M. PATON
K. PRASAD
R. J. REIFFENSTEIN
(Miss) M. CARROLL SANDERS

*Honorary Associate Professor*
J. D. TAYLOR

## 121.1.12 / DEPARTMENT OF PHYSIOLOGY

*Professor and Head*
M. SCHACHTER

*Associate Professors*
W. H. COTTLE
C. HEATH
E. O. HOHN
L. G. S. NEWSHAM
S. M. PADSHA
R. B. STEIN

*Assistant Professors*
N. CLINCH
P. E. HALLETT

*Lecturers*
(Miss) S. BEILENSON
(Mrs.) J. GAUNCE
E. KARPINSKI

*Lecturers*
(Mrs.) J. CLINCH
(Mrs.) M. NURSALL

*Honorary Members*
T. J. SPEAKMAN
R. S. SMITH
R. H. WENSEL

## 121.1.13 / DEPARTMENT OF PSYCHIATRY

*Professor and Head*
K. A. YONGE

*Visiting Professor*
K. DABROWSKI

*Associate Professors*
J. GUILD
P. HAYS
T. E. WECKOWICZ

*Assistant Professors*
J. T. GIBBS
C. P. HELLON
C. LARSEN
D. O. C. RAPIER
P. A. ROXBURGH

*Clinical Professors*
T. C. MICHIE
S. S. SPANER

*Associate Clinical Professor*
A. R. SCHRAG

*Assistant Clinical Professor*
A. D. MacPHERSON

*Clinical Lecturers*
H. M. BACON
H. M. BARKER
L. J. LeVANN

*Clinical Instructors*
G. D. CARSON
I. A. DeCOUTERE
J. D. EARP
H. FUERST
M. M. HORNE
N. C. HORNE
H. PASCOE
D. L. PHILLIPS
F. SCOTT
Z. SELINGER
J. THOMPSON
H. WOJCICKI

*Sessional Clinical Instructor*
(Miss) M. A. DAVIS

*Honorary Clinical Instructor*
S. FIALKOW

*Honorary Member*
R. R. MacLEAN

## 121.1.14 / DEPARTMENT OF RADIOLOGY

*Professor and Head*
F. McCONNELL

*Associate Professor*
T. R. OVERTON

*Assistant Clinical Professor*
R. M. CLARE
S. C. WINDLE

*Clinical Lecturers*
J. E. BACHYNSKI
L. B. COSTOPOULOS
I. D. HENDIN
C. E. HOLMES
C. F. HYNDMAN
J. D. R. MILLER
W. R. PARKER
M. E. TULLOH

*Clinical Instructors*
W. E. BEAMISH
M. J. BRINDLE
P. K. KEOGH
W. P. LISTON
L. L. MALLETT
J. T. MASON
E. TANASIUK

## 121.1.15 / DEPARTMENT OF SURGERY AND CLINICAL SURGERY

*Professor and Head*
R. A. MacBETH

*Professors*
W. S. ANDERSON
W. C. MacKENZIE

*Associate Professor*
P. A. SALMON

*Assistant Professors*
O. G. THURSTON
W. W. YAKIMETS

*Clinical Professors*
B. MICHALYSHYN
G. L. WILLOX
T. S. WILSON

*Assistant Clinical Professors*
C. A. ALLARD
W. F. M. HALL
A. W. HARDY
R. J. JOHNSTON
S. KLING
M. M. LASKIN
A. B. McCARTEN
H. L. RICHARD
W. A. SHANDRO
A. E. THEMAN
H. T. G. WILLIAMS

*Clinical Lecturers*
J. ANSELMO
G. R. BOILEAU
G. F. BONDAR
W. A. MacLEAN
B. MARGOLUS
W. PISESKY
J. SIEGENBERG
C. H. W. WEINLOS

*Clinical Instructors*
F. W. TURNER
E. S. ALLIN
G. E. ALLIN
M. BESNEY
R. G. DAVIS
M. H. W. FRIEDMAN
R. M. HACKETT
H. D. HEBB
H. A. HYDE
R. E. JESPERSEN
H. L. LINKS
W. PAWLUK
W. A. STRUTZ

*Sessional Instructors*
H. A. MYERS
E. J. TWOREK

*Teaching Fellows*
S. F. COX
T. HAYASHI
G. B. OLSEN
N. A. RETY

EXPERIMENTAL SURGERY

*Professor and Head*
K. P. KOWALEWSKI

BIOCHEMISTRY

*Assistant Professor*
J. C. RUSSELL

*Consultant Pathologist*
T. A. KASPER

*Research Associates (General Surgery)*
G. F. BONDAR
R. C. BOAKE

NEUROSURGERY

*Clinical Professor and Head*
T. J. SPEAKMAN

*Clinical Professor*
G. K. MORTON

*Assistant Professor*
R. S. SMITH

*Clinical Lecturer*
P. B. R. ALLEN

*Clinical Instructors*
R. A. BAILEY
B. K. A. WEIR

OPHTHALMOLOGY

*Associate Professor*
T. A. S. BOYD

*Clinical Lecturer*
D. T. R. HASSARD

*Clinical Instructor*
D. L. REES

*Sessional Instructor*
A. PATRICK

ORTHOPAEDIC SURGERY

*Clinical Professor*
O. ROSTRUP

*Associate Professor*
W. M. RIGAL

*Clinical Lecturers*
G. W. CAMERON
F. G. DAY
J. L. GULLEY
J. R. HUCKELL
D. C. JOHNSTON
A. H. McKENZIE
J. P. MOREAU
G. L. WILSON

*Clinical Instructors*
H. W. BOUWMAN
D. R. COLTER
G. E. EDWARDS
J. GORT
B. J. GREENHILL
R. S. HENDERSON
R. G. TOWNSEND

*Sessional Instructor*
S. SINGH

OTOLARYNGOLOGY

*Clinical Professor*
K. A. C. CLARKE

*Assistant Clinical Professor*
T. C. WILSON

*Clinical Lecturer*
P. T. QUINLAN

*Clinical Instructors*
L. T. DIDUCH
J. KEOHANE
R. W. MALLEN
S. J. WARSHAWSKI

*Sessional Instructor*
M. STARKO

PLASTIC SURGERY

*Assistant Clinical Professor and Head*
J. D. M. ALTON

*Assistant Clinical Professor*
E. HITCHIN

*Clinical Lecturer*
E. W. BISSELL

*Clinical Instructors*
K. S. CLARKE
H. J. SHIMIZU

THORACIC AND CARDIOVASCULAR

*Clinical Professor*
J. C. CALLAGHAN

*Associate Professor*
C. M. COUVES

*Clinical Lecturers*
C. S. DAFOE
C. A. ROSS
L. P. STERNS

*Clinical Instructor*
H. MELTZER

UROLOGICAL SURGERY

*Clinical Professor and Head*
J. O. METCALFE

*Associate Professor*
W. H. LAKEY

*Assistant Clinical Professors*
F. D. CONROY
R. R. FRANCIS

*Clinical Instructors*
T. C. EID
L. GIROUX
F. C. MARSHALL
H. C. RAMAGE

*Honorary Members*
N. E. ALEXANDER
R. L. ANDERSON
W. S. S. ARMSTRONG
M. R. MARSHALL
M. WEINLOS

## 121.2 / *General Information*

The Faculty of Medicine of The University of Alberta was established in 1913 and until 1922 conducted a three-year undergraduate medical program in the basic medical sciences.

Classes were first held in Pembina Hall on The University of Alberta Campus. The present Medical Sciences Building was completed in 1921.

In 1923 a full program of clinical instruction was begun in the affiliated University of Alberta Hospital and the first

Doctor of Medicine degrees were awarded in 1925.

A Health Sciences Centre including the Faculty of Medicine and the University of Alberta Hospital is now under development. A new Clinical Sciences Building providing expanded teaching and research facilities for the clinical departments of the Faculty will be completed in 1968.

Formal affiliation exists with the Edmonton General Hospital; the Misericordia Hospital, Edmonton; the Glenrose Provincial Hospital; and the Royal Alexandra Hospital.

The Faculty of Medicine conducts a fully-accredited four-year program leading to the degree of Doctor of Medicine. Two pre-medical years at University are required before admission to this program. The Faculty also offers a four-year program leading to the degree of Bachelor of Science in Medical Laboratory Science, which may be entered at the matriculation level, and a one-year program to be taken in conjunction with the M.D. program leading to the degree of Bachelor of Sciences in Medicine.

At the graduate level, the Faculty offers programs leading to the degrees of Master of Science, Master of Health Services Administration, and Doctor of Philosophy, as well as a program leading to eligibility for specialist qualification by the Royal College of Physicians and Surgeons of Canada. It also maintains an extensive program of continuing medical education.

Details of all these programs will be found in § 123, below.

## 121.3 / *Associated Hospitals and Institutions*

### 121.3.1 / ASSOCIATED HOSPITALS

The main teaching Hospital of the Faculty of Medicine is the University of Alberta Hospital (1,200 beds) which is located on the University campus. This hospital is closely associated with the Faculty under a Health Sciences Centre Co-ordinating Council.

The Clinical Departments, clinical teaching facilities, special services, and research facilities of the Faculty are contained in the Clinical Sciences Building on the Hospital grounds.

The Royal Alexandra Hospital (925 beds), Glenrose Provincial Hospital, the Misericordia Hospital (925 beds), and the Edmonton General Hospital (530 beds) are officially affiliated with the Faculty of Medicine.

By special arrangement undergraduate and graduate programs are also conducted in the following hospitals associated with the Faculty: Charles Camsell Hospital; Alberta Hospital, Ponoka; Alberta Hospital, Edmonton; and Aberhart Memorial Sanatorium, Edmonton.

### 121.3.2 / THE UNIVERSITY OF ALBERTA FAMILY CLINIC

An ambulatory patient facility, specifically designed for undergraduate and graduate medical education is located in the University of Alberta Hospital. This "Family Clinic" provides students with practical experience in the provision of comprehensive and continuing health care to a representative section of the community under the supervision of members of the Faculty.

### 121.3.3 / THE UNIVERSITY OF ALBERTA SURGICAL-MEDICAL RESEARCH INSTITUTE

The University of Alberta Surgical-Medical Research Institute offers facilities for members of the clinical faculty in the field of experimental medicine. Facilities are also available for research fellows in clinical departments to conduct projects under the supervision and direction of the Faculty. The Institute offers a one trimester postgraduate course in experimental surgery.

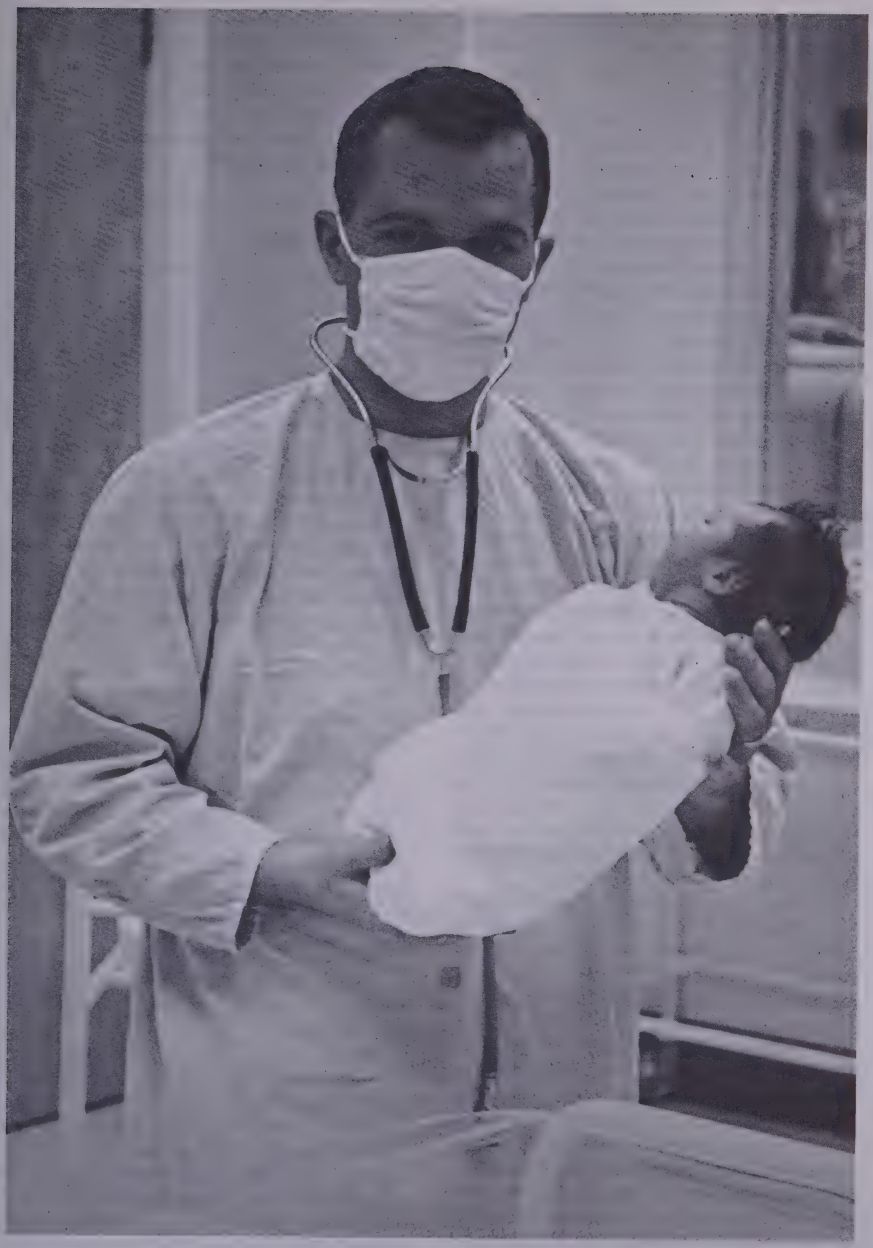
### 121.3.4 / THE UNIVERSITY OF ALBERTA CANCER RESEARCH INSTITUTE

Established in co-operation with the Canadian Cancer Society and the University, the Unit is housed in the Dr. John S. McEachern Cancer Research Laboratory. It is one of four such units located by the National Cancer Institute in Canadian medical schools. Several postdoctoral research fellowships, for which application may be made to the Director, will be available each year.

## 121.4 / *Internship and Licensure*

*Internship.* Medical graduates of The University of Alberta are required to complete satisfactorily a one-year internship in a hospital approved by the Council of the Faculty.

The Council of the Faculty annually issues a list of hospitals at which an internship satisfactory to the Council may be taken. Copies of this list will be distributed to the graduating class and may be obtained from the Office of the Dean.



Internship placement is handled by the Canadian Association of Medical Students and Internes Intern Placement Service.

*Educational Register.* All graduates serving an internship in the Province of Alberta are required, by provincial legislation, to be registered on the Educational Register of the College of Physicians and Surgeons of Alberta. This registration permits the practice of medicine within the hospital designated on the registration. Graduates in residency programs in Alberta who are not registered practitioners in the Province are similarly required to be registered on the Educational Register. Application should be made to the Registrar, College of Physicians and Surgeons of Alberta.

*Requirements for Licence to Practise.* After graduates of The University of Alberta have satisfactorily completed a year's internship in a hospital approved by the Faculty, they are entitled to be licensed by the College of Physicians and Surgeons of this province without further examination and are eligible for provincial registration. To become licensed in any other province of the Dominion, however, it is necessary, either to write the provincial examinations of the licensing body in the province concerned or to gain the qualification of the Medical Council of Canada. The latter carries the right to register in any province provided all the educational requirements of the licensing body of that province are met and to register with the General Medical Council of the United Kingdom.

*Medical Council of Canada Examinations.* Examinations of the Medical Council of Canada are conducted at The University of Alberta at times specified by the Council. Students in the fourth year are required to sit these examinations prior to graduation. The subjects of examination are Medicine (including Therapeutics), Surgery, Preventative Medicine, Paediatrics, and Obstetrics and Gynaecology. Psychiatry may be added as a subject of examination in 1969.

*National Board of Medical Examiners.* Students who wish to take the examinations of the National Board of Medical Examiners of the United States may take the Part I examination at the end of the second year of the undergraduate program and the Part II examination at the end of the fourth year.

*Registration for Practice.* The holder of a licence to practise must register with the professional organization in the particular province concerned. In Alberta, this is the College of Physicians and Surgeons of the Province of Alberta; for information regarding provincial registration address the Registrar of the College, Dr. R. Woolstencroft, 9901 - 108th Street, Edmonton, Alberta. Students who intend to practise in any other province should secure information from the provincial body concerned as early as possible in their medical program so that they may know of any special educational conditions which must be fulfilled.

## 121.5 / *Finance*

Instruction and General fees charged to students in the Faculty of Medicine are listed in § 15 of the University Regulations section of the Calendar. In addition, medical students are required to spend approximately $150.00 to $200.00 each year for books, supplies, and instruments. Fourth-year medical students are required to pay an examination fee of $175.00 to the Medical Council of Canada in January of their final year.

Details of scholarships and other forms of financial assistance available to medical students will be found in the Awards section of the Calendar, §§ 223 to 228, below.

## 121.6 / *Society Memberships*

The *Medical Undergraduate Society* is the officially recognized organization of medical students. It represents the medical students of The University of Alberta in the Canadian Association of Medical Students and Interns and provides social, recreational, and cultural activities. It is authorized to collect a membership fee from each student.

The Society establishes a Student Liaison Committee each year to work with the Faculty in developing and assessing the medical program.

The *Medical Alumni Association* is an organization of all graduates in Medicine from The University of Alberta. The Association takes an active interest in the Faculty and provides a limited loan fund for undergraduate and graduate students. In addition the Association participates in a number of awards to students and, from time to time, finances specific projects in the Faculty. The Association meets annually in conjunction with the Alberta Medical Association annual meeting.

## 122.1 / *Admission*

### 122.1.1 / M.D. PROGRAM

(1) *Academic requirement.* The basic academic requirement for admission to the M.D. program is the satisfactory completion, after senior matriculation, of at least two years of university work approved by the Faculty of Medicine, including full university courses in Organic Chemistry, Inorganic Chemistry, Physics, and Zoology (or Biology). This requirement can be met in various degree patterns in different faculties.

Applicants are encouraged to take one or more of the following subjects in their premedical program, if possible: Mathematics, Statistics, Genetics, Psychology and Anthropology or Sociology. Applicants are advised *not* to take courses in Biochemistry or Physiology, as these are included in the medical program.

(2) *Scholastic standing.* Consideration for admission will be given only to students who have obtained an over-all average of at least 5.5 (65 per cent in terms of the grading system previously in use) in the work of all preceding university years.

(3) *Personal requirements.* While admission to the M.D. program is granted largely on the basis of academic standing, the lack of essential personal qualities in an applicant may be deemed sufficient cause for refusal of admission.

(4) *Residence requirement.* Priority for admission is given to students completing their entrance requirements at a university in Alberta, or to students from Alberta in attendance at other universities. Only a very limited number of outside applicants, including foreign students sponsored by appropriate agencies, can be considered.

(4) *Medical College Admission Test.* All applicants are required to take the Medical College Admission Test. This test, prepared under the auspices of the Association of American Medical Colleges, is conducted at Edmonton by the Student Counselling Service in May and October of each year. An application to take this test, together with a fee of $15.00, must be sent direct to the Psychological Corporation, New York, three weeks before the date of the test. Details and application forms may be obtained from the office of the Dean of Medicine, from the Student Counselling Service at The University of Alberta, or from the Registrar of The University of Calgary.

(6) *Application deadlines.* Students in attendance at Alberta universities should make application for admission to the Registrar by January 1. Applications will continue to be received until April 1; later applications cannot be accepted.

(7) *Interview.* Applicants are required to arrange, through the office of the Dean, a personal interview with a member of the Admissions Committee of the Faculty. Such interviews will be conducted in both Edmonton and Calgary.

(8) *Deposit.* Applicants will be advised of the decision of the Admissions Committee in early June. Successful applicants, upon acceptance of a place in the first-year class, are required to make a deposit of $25.00 to the Bursar of the University of Alberta. This deposit will be applied on tuition fees when the student registers. Should a candidate withdraw after once accepting a position this deposit will be forfeited.

(9) Applicants are reminded of the regulations set out in §§ 13.1.2, 13.1.3, and 13.1.4 of the University Regulations section of the Calendar.

### 122.1.2 / B.Sc. PROGRAM IN MEDICAL LABORATORY SCIENCE

The matriculation requirements for admission to the B.Sc. program in Medical Laboratory Science are set out in §§ 13.1 and 13.12.2 of the University Regulations section of the Calendar.

NOTE A: *Personal Requirements.* Applicants must have satisfactory personality and physique and must meet the health and physical requirements of the University Health Service.

NOTE B: *Interview.* Each applicant is required to have a personal interview before his application can be considered complete. Further information and appointments for interview may be obtained from Dr. H. E. Bell at the University of Alberta Hospital.

NOTE C: *No admission with advanced standing.* Owing to limitation of facilities, it is not possible to give consideration to the admission of students from other programs to the second or subsequent years of the Medical Laboratory Science program.

## 122.2 / *Academic Standings and Graduation*

### 122.2.1 / M.D. PROGRAM

(1) The Council of the Faculty of Medicine approves the principle that the means of assessing a student's progress and determining his grades may vary from one department to another in accordance with the nature of the course. Factors other than examination results may be used to a variable extent by instructors in determining grades but students will be informed at the commencement of the course how grades are to be determined.

(2) Although the minimum passing grade for undergraduate courses in the University is 4, a medical student with a grade of less than 5 in any subject will not be permitted to proceed in the M.D. program, except at the discretion of the Faculty.

(3) A student with a grade point average of less than 5.0 is not normally eligible for supplemental examinations.

(4) A student neglecting to take a supplemental examination will not be allowed to continue in Medicine.

(5) No student will be allowed to proceed to any year of the medical program unless he has completed all the work of the previous year.

(6) No student will be allowed to repeat the first year of the medical program unless in special circumstances deemed adequate by the Faculty.

(7) A student permitted to repeat a failed year who fails to obtain a satisfactory record in his First-Term examinations in that year will be required to withdraw permanently from the Faculty.

(8) Except in very unusual circumstances, a student who is repeating either the first or the second year of Medicine will be required to withdraw unless he has obtained a grade-point average of at least 5.5 in the work of the repeated year.

(9) Any student whose work, or performance, is deemed unsatisfactory will be required to withdraw from the Faculty of Medicine.

### 122.2.2 / B.Sc. PROGRAM IN MEDICAL LABORATORY SCIENCE

(1) The pass mark in any subject of the Medical Laboratory Science program is a grade of 4.

(2) A student who has failed one or more subjects in any year may be granted supplemental examination privileges at the discretion of the Faculty Council.

(3) The pass mark in supplemental examinations in Medical Laboratory Science is a grade of 4. A student who fails to pass or neglects to take a supplemental examination will be required to repeat the failed course or his entire year at the discretion of the Faculty Council.

(4) Promotion to any year of the Medical Laboratory Science program depends upon completion of all work of the previous year with a grade point average of at least 5.0.

(5) In order to graduate, a student must have obtained an over-all grade-point average of at least 5.0 in the work of all four years of the program.

# 123 / PROGRAMS OF STUDY

## 123.1 / *The Degree of M.D.*

### 123.1.1 / GENERAL INFORMATION

The Faculty of Medicine conducts a fully-accredited, four-year program leading to the degree of Doctor of Medicine. Each year of the program contains thirty-three weeks of instruction, from early September until mid-May. The first two years of the program comprise a study of the basic medical sciences and an introduction to clinical medicine. The last two years, one of which is organized on a quarter and the other on a trimester system, comprise clinical study and experience in hospitals associated with the Faculty

Commencing in 1971, the third and fourth years of the program may be extended, thereby reducing the summer vacation between these years to four weeks. Students registering in their first year in 1968 or subsequently will be informed of the development of the program.

NOTE: Major revisions of the M.D. program are being undertaken, and alterations from the program described in this Calendar will be introduced prior to the 1968-69 Session. Details will be announced.

### 123.1.2 / FIRST YEAR

| | *First Term Hours* | *Second Term Hours* |
|---|---|---|
| ANAT 411 (Preclinical Anatomy) | 3-11 | 2-4 |
| ANAT 413 (Human Cytology, Histology, and Organology) | 2-4 | 2-4 |
| ANAT 414 (Anthropology) | — | 1-0 |
| BIOCH 411 (General Biochemistry) either or | 3-0 | 3-4 |
| MED 411 (Man and his Environment) | 4-0 | 5-0 |
| PHYSL 411 (Human Physiology) | 3-4 | 3-4 |
| Electives | — | 0.4s |

### 123.1.3 / SECOND YEAR

| | | |
|---|---|---|
| AP ANAT 421 (Surgical Anatomy) | 1½-0 | 1½-0 |
| BACT 421 (Pathogenic Bacteriology) | 3-3½ | 1½-2½ |
| MED 421 (Introduction to Medicine) | 0-14c | 0-11c |
| NEURO SC 421 (Neuroanatomy, Neurophysiology, Neurology, and Neurosurgery) | 2-2 | 2-2 |
| OB & GYN 421 (Introduction to Obstetrics and Gynaecology) | 1-0 | 1-0 |
| PAED 421 (Introduction to Paediatrics) | 1-0 | — |
| PATH 421 (General and Special Pathology) | 4-2 | 4-2 |
| PMCOL 421 (Basic Pharmacology) | 3-2 | 2-0 |
| RADIOL 421 (Introduction to Radiology) | 1-0 | 1-0 |
| Electives | — | 0-8s |

### 123.1.4 / THIRD YEAR

The third year of the medical program is divided into three "trimesters". During one trimester the student will take a clinical course in Medicine; during a second, clinical courses in Obstetrics and Gynaecology and Paediatrics; during a third, a clinical course in Surgery (not necessarily in that order). The pattern for the three trimesters is as follows:

| | *Tri-mester Hours* | *Tri-mester Hours* | *Tri-mester Hours* |
|---|---|---|---|
| MED 431 (Survey of Disease) | 6-0 | 6-0 | 6-0 |
| MED 435 (Clinical Medicine) | 0-27c | — | — |
| OB & GYN 431 (Obstetrics and Gynaecology) | 2-0 | 2-0 | 2-0 |
| OB & GYN 435 (Clinical Obstetrics and Gynaecology) (four weeks) | — | 0-27c | — |
| OPHTH & ROL 431 (Ophthalmology and Rhino-Oto-Laryngology) | 1-0 | 1-0 | 1-0 |
| PATH 431 (Special Pathology) | 0-3 | 0-3 | 0-3 |
| PAED 435 (Clinical Paediatrics) (seven weeks) | — | 0-27c | — |
| PR MED 431 (Community Medicine) | 1-4 | 1-0 | 1-0 |
| SURG 435 (Clinical Surgery) | — | — | 0-27c |

### 123.1.5 / FOURTH YEAR

Each week of the fourth year includes a minimum of thirty-six hours devoted to clinical clerkship, distributed as shown below.

| | *Hours per week* |
|---|---|
| MED 441 (Scientific Basis of Medicine) | 0-4 |
| MED 445 (Clinical clerkship in Medicine) (twelve weeks) | 0-36c |
| OB & GYN 445 (Clinical clerkship in Obstetrics and Gynaecology) (four weeks) | 0-36c |
| PAED 445 (Clinical clerkship in Paediatrics) (four weeks) | 0-36c |
| PSYCH 445 (Clinical clerkship in Psychiatry) (four weeks) | 0-36c |
| SURG 445 (Clinical clerkship in Surgery) (eight weeks) | 0-36c |

## 123.2 / *The Degree of B.Sc. in Medical Laboratory Science*

### 123.2.1 / GENERAL INFORMATION

The Faculty of Medicine conducts a four-year program in Medical Laboratory Science, intended to qualify selected applicants for a career as laboratory supervisors or senior technologists in hospitals or medical science laboratories. The first, second, and fourth years of the program are regular university years. The third year, beginning in mid-May, consists of a twelve-month period of practical laboratory training under the direct supervision of the Faculty of Medicine. Students will receive some remuneration from the hospital in which they work during the third year of the program. At the end of this year, they are eligible to take the examinations of the Canadian Society of Laboratory Technologists.

NOTE: Because individuals working in hospital laboratories run some risk of infection from materials which they will be handling, all students in the Medical Laboratory Science program must take a series of immunizations approved by the office of the Dean of Medicine before beginning the third year.

### 123.2.2 / PROGRAM OF COURSES

| *First Year* | *First Term Hours* | *Second Term Hours* |
|---|---|---|
| BIOL 130 or 230 (Biology) | 3-3 | 3-3 |
| CHEM 230 (Inorganic Chemistry) | 3-4 | 3-4 |
| CHEM 250 (Organic Chemistry) | 3-3 | 3-3 |
| ENGL 200 or 210 (English) | 3-0 | 3-0 |
| PHSYL 261 (Physiology) | 3-3 | 3-3 |
| P ED 218 (men) or 228 (women) (Physical Education) | 0-2 | 0-2 |

| *Second Year* | *First Term Hours* | *Second Term Hours* |
|---|---|---|
| BACT 361 (Bacteriology) (Note A) | 3-3 | 3-3 |
| BIOCH 400 (Clinical Biochemistry) (Note A) | 2--3 | 2-3 |
| CLIN PATH 361 (Clinical Pathology) (Note A) | 3-6 | 3-6 |
| PHYS 100 or 200 (Physics) | 3-2 | 3-2 |
| An approved Humanities or Social Science option | 3-0 | 3-0 |
| *Third Year* | | |
| BIOCH 300 or 372 (Biochemistry) | 3-3 | 3-3 |
| M L S 400 (Hospital Practice) (Note B) | — | — |
| *Fourth Year* | | |
| BIOCH 401 (Clinical Biochemistry) | 2-0 | — |
| CHEM 312 (Analytical Chemistry) | 3-6 | 3-6 |
| PATH 401 (Clinical Pathology—Medical Laboratory Science) | 3-6 | 3-6 |
| An approved Natural Science option | 3-0 | 3-0 |
| An approved Humanities or Social Science option | 3-0 | 3-0 |

NOTE A: *Interdepartmental teaching.* In the second and subsequent years of the Medical Laboratory Science program, teaching in Clinical Pathology, Clinical Biochemistry, and Bacteriology is combined on an interdepartmental basis, and examinations in these subjects may also be combined.

NOTE B: *Hospital practice.* During the period of hospital practice, students will be registered as in full-time attendance at the University and will be assigned for training to hospital laboratories approved for this purpose by the Council of the Faculty of Medicine.

## 123.3 / *The Degree of B.Sc. in Medicine*

A one-year program of study in a branch of medical science leading to the degree of Bachelor of Science in Medicine may be undertaken either at the completion of the second year of the medical program or following the degree of M.D. The work for this degree may be carried out in any department of the Faculty of Medicine, but may not be taken concurrently with any part of the medical curriculum nor by a student carrying any condition in his medical program.

## 123.4 / *Graduate Study*

### 123.4.1 / THE DEGREES OF M.SC. AND PH.D.

Programs leading to the degree of Master of Science or Doctor of Philosophy in any of the basic medical sciences, in experimental medicine, and in experimental surgery are conducted under the auspices of the Faculty of Graduate Studies. These programs are open to graduates in Medicine or to holders of an acceptable B.A. or B.Sc. degree who can meet the requirements of the Faculty of Graduate Studies.

For further information, see the Graduate Studies section of the Calendar.

### 123.4.2 / THE DEGREE OF M.H.S.A.

A two-year program leading to the degree of Master of Health Services Administration is offered under the auspices of the Faculty of Graduate Studies. It consists of classwork, field work, and residency training in one of the following areas: Hospital Administration, Medical Care Administration, and Public Health Administration.

For further information, see the Graduate Studies section of the Calendar.

### 123.4.3 / GRADUATE TRAINING IN MEDICAL AND SURGICAL SPECIALTIES

A graduate training program leading to eligibility for specialist qualification by the Royal College of Physicians and Surgeons of Canada is offered in the following clinical specialties, Anaesthesiology, Bacteriology, General Surgery, Internal Medicine, Neurology, Neurosurgery, Obstetrics and Gynaecology, Ophthalmology, Orthopedic Surgery, Otolaryngology, Paediatrics, Pathology, Physical Medicine and Rehabilitation, Psychiatry, Radiology (Diagnostic), Radiology (Therapeutic—two years), Thoracic and Cardiovascular Surgery, and Urology.

In all specialties clinical training takes the form of successive residency appointments with increasing responsibility, during which seminar and directed reading programs are conducted covering the scope of the specialty. Undergraduate teaching forms part of the duties of senior trainees.

This graduate training program is open to suitably qualified graduates who are eligible for the Educational Register of the College of Physicians and Surgeons of Alberta. For foreign medical graduates this necessitates possession of the E.C.F.M.G. certificate or its equivalent.

Inquiries regarding this program should be directed to The Chairman, Committee on Graduate Training, Faculty of Medicine, The University of Alberta.

## 123.5 / *Continuing Medical Education*

A program of postgraduate courses and regional, hospital-based conferences is organized by the Department of Continuing Medical Education in close co-operation with the Canadian Medical Association, Alberta Division, and the College of General Practice, Alberta Chapter. The Department also undertakes to provide in-hospital experience for those practising physicians who wish to take advantage of such an opportunity. The objective of the Department is to assist and encourage doctors engaged in the clinical practice of medicine to keep abreast of recent advances in medical knowledge and technology.

# 124 / DETAILS OF COURSES

## 124.1 / *General Information*

In the following sections, courses included in the medical program are listed in alphabetical order. Courses included in the Medical Laboratory Science program are listed separately in § 124.18.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Following the title of the course is the symbol "♦", standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages. Some courses are offered for credit only and carry no weight.

The next two figures, enclosed in parentheses, represent the number of hours of lecture and laboratory instruction, respectively, required by the course in a week. Where they appear, the symbols "C", "S", and "L" denote hours of clinical instruction, seminar work, and combined lecture-laboratory instruction, respectively. The hours of instruction are the same in both terms unless otherwise indicated. If the course lasts only one term, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 124.2 / *Anaesthesia*

Instruction in Anaesthesia is included in Medicine 431, Medicine 441, and Medicine 445. A full residency program leading to specialist qualification in Anaesthesiology is offered in affiliated hospitals.

## 124.3 / *Anatomy*

### 124.3.1 / UNDERGRADUATE COURSES

ANAT 411. *Preclinical Anatomy.* ♦12 (3-11, First Term; 2-4, Second Term). A survey of the human body from a medical point of view, through the media of participation in laboratory work using modern equipment and original techniques and of television demonstrations. Designed to enable the student to acquire a sound knowledge of basic anatomy as required in the clinical years and to develop a concept of the total body. Instructors: R. D. Laurenson and staff.

ANAT 412. *Gross Anatomy.* See description under the Faculty of Dentistry.

ANAT 413. *Human Cytology, Histology, and Organology.* ♦8 (2-4). The minute structure of all cells, tissues, and organs of the human body. Laboratory work with tutorial assistance allows for group learning and self-teaching. Instructors: W. R. Salt and staff.

ANAT 414. *Anthropology.* ♦nil (Second Term, 1-0). A brief survey of ancient man and man's place in nature. Prerequisite: Anatomy 411 or 412. Instructor: R. F. Shaner.

ANAT 417. *Microscopic Anatomy.* See description under the Faculty of Dentistry.

### 124.3.2 / GRADUATE COURSES

ANAT 601. *Histology and Cytology.* (2-4).

ANAT 602. *Developmental Anatomy.* (First Term, 2-4).

ANAT 603. *Physical Anthropology.* (Second Term, 2-2).

ANAT 604. *Advanced Neuroanatomy.* (2-2).

## 124.4 / *Bacteriology*

### 124.4.1 / UNDERGRADUATE COURSES

BACT 361. *Pathogenic Bacteriology.* ♦6 (3-3). Note: Open to students in Medical Laboratory Science, and to others with consent of the Department.

BACT 421. *Pathogenic Bacteriology.* ♦6 (2-3, First Term; 1-2, Second Term). The role of bacteria, viruses, fungi, and protozoa in infection and disease. Mechanisms of microbial pathogenicity and human resistance. Bacteriological procedures applicable to the diagnosis, control, and treatment of infectious disease. Note: For students in the M.D. program. Open to honors and graduate students with consent of the Department.

### 124.4.2 / GRADUATE COURSES

BACT 501. *Microbiology Literature Review.*

BACT 504. *Medical Mycology.* (One Term, 0-3).

A full graduate program leading to specialist recognition is offered in affiliated institutions.

## 124.5 / *Biochemistry*

### 124.5.1 / UNDERGRADUATE COURSES

BIOCH 300. *General Biochemistry.* ♦6 (3-3). Structure and chemistry of the cell; the chemistry and metabolism of carbohydrates, lipids, proteins, and nucleic acids; the molecular biology of enzymes and genes as related to the functioning of the living cell. Prerequisites: Chemistry 230 and 250.

BIOCH 372. *Topics in Biochemistry.* ♦6 (3-1s-3). The topics of Biochemistry 300 discussed in a more rigorous manner. The seminars will deal with current research in biochemistry and molecular biology. Prerequisites: Chemistry 230 and 250. Chemistry 370 or 372 and Mathematics 201 desirable as prerequisites or corequisites. Note: Designed for honors students, graduate students, and selected students from all departments.

BIOCH 400. *Clinical Biochemistry.* ♦6 (2-3). Prerequisites: Chemistry 230 and 250.

BIOCH 401. *Advanced Clinical Biochemistry.* ♦3 (First Term, 2-0). Prerequisite: Biochemistry 300, 372, or 400.

BIOCH 411. *General Biochemistry.* ♦6 (3-4, First Term; 3-0, Second Term). Structure and chemistry of the cell; the chemistry and metabolism of carbohydrates, lipids, proteins, and nucleic acids; the molecular biology of enzymes and genes as related to the functioning of the living cell. Seminars with members of the clinical teaching staff on the correlation between basic biochemical concepts and clinical situations. Prerequisites. Chemistry 230 and 250.

### 124.5.2. / GRADUATE COURSES

BIOCH 511. *Enzymology.* ♦3 (First Term, 3-0).

BIOCH 512. *Metabolic and Cellular Control Mechanisms.* ♦3 (Second Term, 3-0).

BIOCH 521. *Nucleic Acids.* ♦3 (Second Term, 3-0).

BIOCH 531. *Chemistry of Proteins.* ♦3 (First Term, 3-0).

BIOCH 541. *Nucleotide Metabolism.* ♦3 (Second Term, 3-0).

BIOCH 561. *Chemistry of the Erythrocyte.* ♦3 (Second Term, 3-0).

## 124.6 / *Community Medicine*

### 124.6.1 / UNDERGRADUATE COURSES

PR MED 431. *Public Health and Preventive Medicine.* ♦2 (1-4, first trimester; 1-0, second and third trimesters). The relationship of health departments at the various levels of government to the practice of medicine by the private practitioner; the role and function of paramedical personnel and health agencies in the practice of comprehensive medical care and the management of patients.

### 124.6.2 / FAMILY PRACTICE PROGRAM

During the third year of the medical program each student is assigned to a practitioner in the city and, with guidance, has the opportunity to assume some of the professional roles of a physician. The student gains from first-hand experience some appreciation of the psycho-social and economic factors related to the illness of the patient and/or family.

### 124.6.3. / GRADUATE COURES

See the Graduate Studies section of the Calendar.

## 124.7 / *Elective Courses*

A program of "electives", including medically-related courses, other academic courses, and research projects, is available to students in the first and second years of the medical program. These electives make it possible for the student to pursue one or more subjects in which he has a particular interest to a greater depth than the standard curriculum allows. Details of electives are announced at the start of the Session.

## 124.8 / *Interdepartmental Courses*

### 124.8.1 / GENERAL INFORMATION

The Faculty of Medicine offers much of its instruction in clinical subjects on an interdepartmental basis, so that the clinical work in each year of the medical program constitutes an integrated whole. In most instances, examinations are also integrated.

### 124.8.2 / FIRST YEAR COURSE

MED 411. *Man and his Environment.* ♦nil (0-4s; 0-5s). An introduction to clinical medicine, with emphasis on the interaction of man and his environment in health and disease. Social and preventive medicine. An introduction to physical diagnosis. Instructors: members of the Departments of Anatomy, Bacteriology, Community Medicine, Medicine and Clinical Medicine, Paediatrics, Pharmacology, Psychology, and Surgery and Clinical Surgery. Co-ordinators: P. M. Crockford and O. Thurston.

### 124.8.3 / SECOND YEAR COURSES

APPL ANAT 421. *Applied Anatomy.* ♦4 (1½-0). Surgical anatomy. Co-ordinator: R. A. Macbeth.

MED 421. *Introduction to Medicine.* ♦8 (0-14s; 0-11s). Principles underlying disease; the interpretation of symptoms and symptom complexes, physical and emotional; physical diagnosis, clinical biochemistry, clinical pathology, genetics, statistics, and orthopaedics. Instructors: members of the Departments of Anatomy, Bacteriology, Biochemistry, Community Medicine, Medicine and Clinical Medicine, Paediatrics, Pathology, Pharmacology, Psychology, and Surgery and Clinical Surgery. Co-ordinator: B. J. Sproule.

NEUR SCI 421. *Neurological Sciences.* ♦6 (2-2). An integrated course in neuroanatomy, neurophysiology, neuropharmacology, neurology, and neurosurgery. Instructors: members of the Departments of Anatomy, Pharmacology, and Physiology. Co-ordinator: G. Monckton.

### 124.8.4 / THIRD YEAR COURSE

MED 431. *Survey of Human Disease.* ♦6 (6-0). "Case-centred" presentations designed to give an integrated view of human disease. Instructors: members of the Departments of Anaesthesia, Biochemistry, Community Medicine, Medicine and Clinical Medicine, Paediatrics, Psychiatry, and Surgery and Clinical Surgery. Co-ordinator: L. E. McLeod.

### 124.8.5 / FOURTH-YEAR COURSE

MED 441. *The Scientific Basis of Medicine.* ♦nil (0-4s). The relation of the basic and clinical sciences to medical practice. Therapeutics; medical ethics and economics; medical jurisprudence; and toxicology. Instruction includes theatre clinics, clinicopathological conferences ,and panel discussions. Instructors: members of all departments of the Faculty. Co-ordinator: J. A. L. Gilbert.

## 124.9 / *Medicine and Clinical Medicine*

### 124.9.1 / UNDERGRADUATE COURSES

MED 435. *Clinical Medicine.* ♦8 (one trimester, 0-27c). A clerkship of eleven weeks in which the student will be responsible for complete case history, physical examination, laboratory investigation, and follow-up on assigned cases. Bedside clinics, conferences, and case presentations by the student. Co-ordinator: L. E. McLeod.

MED 445. *Clinical Clerkship.* ♦8 (twelve weeks, 0-36c). A clerkship in various affiliated hospitals and in the Out-Patient department. An additional sixteen hours per week are devoted to a reading project. Instructors: D. R. Wilson and staff.

### 124.9.2 / GRADUATE TRAINING

Full residency programs in Internal Medicine and Neurology (with approved training in all sub-specialties of clinical medicine) leading to specialist qualification are offered in affiliated hospitals.

## 124.10 / *Obstetrics and Gynaecology*

### 124.10.1 / UNDERGRADUATE COURSES

OB & GYN 421. *Introduction to Gynaecology.* ♦nil (1-0). Physiology and conduct of normal pregnancy and labor.

OB & GYN D31. *Clinical Obstetrics and Gynaecology.* ♦2 (2-0). Complications of pregnancy, labor, and puerperium. Throughout the year, small groups of students are assigned to an obstetrical tutor. One formal lecture is given each week.

OB & GYN 435. *Clinical Obstetrics and Gynaecology.* ♦2 (four weeks, 0-27c). Students will be assigned to the Department of Obstetrics and Gynaecology for a period of four weeks during one trimester of the third year. One week is spent in the Out-Patient Department of the University Hospital and Cancer Clinic, giving the student clinical exposure to the ambulatory patient. A second week is spent as a clinical clerk living in hospital as a clinical clerk in the case-room area to learn antepartum, case-room, and delivery-room routines. The fourth week is spent in seminar sessions learning obstetrical physical diagnosis and manikin drill.

OB & GYN 445. *Clinical Clerkship.* ♦8 (four weeks, 0-36c). The student is assigned as a clinical clerk for four weeks to the Royal Alexandra Hospital or the Edmonton General Hospital. He will "live in" for two weeks of this time. In addition to daily ward walks, he will attend three seminars a week on important topics in the specialty.

### 124.10.2 / GRADUATE TRAINING

A full residency program leading to specialist qualifications in Obstetrics and Gynaecology is offered in affiliated hospitals.

## 124.11 / *Paediatrics*

### 124.11.1 / UNDERGRADUATE COURSES

PAED 421. *Introduction to Paediatrics.* ♦nil (First Term, 1-0).

PAED 435. *Clinical Paediatrics.* ♦4 (seven weeks, 0-27c). A clerkship during which the student will be assigned cases on which he must do a complete history, physical examination, and laboratory work, and be prepared to make a case presentation at any time. There will also be bedside clinics and conferences.

PAED 445. *Clinical Clerkship.* ♦8 (four weeks, 0-36c). During this clerkship students, under the guidance of a preceptor, will be given some patient responsibility.

## 124.11.2 / GRADUATE TRAINING

A full residency program leading to specialist recognition in Paediatrics is offered in affiliated hospitals.

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# 124.12 / *Pathology*

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## 124.12.1 / UNDERGRADUATE COURSES

PATH 421. *General and Special Pathology.* ♦6 (4-2).
PATH 422. *Pathology.* See description under the Faculty of Dentistry.
PATH 431. *Special Pathology.* ♦6 (0-3). Seminars on pathological change in special organs and tissues with concurrent laboratory demonstrations of gross and microscopic pathological material.

## 124.12.2 / GRADUATE COURSES

PATH 501. *Cellular and Tissue Structure and General Mechanisms of Disease.*
PATH 502. *Reticuloendothelial Sustem and Immunity.*
PATH 503. *Advanced Hematology.*
PATH 504. *Seminars on General Pathology.*
PATH 505. *Fundamentals of Histochemistry.*
PATH 610. *Subcellular Morphology.*

## 124.12.3 / GRADUATE TRAINING

A full residency program leading to specialist qualification in Pathology is offered in affiliated institutions.

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# 124.13 / *Pharmacology*

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## 124.13.1 / UNDERGRADUATE COURSES

PMCOL 421. *Basic Pharmacology.* ♦6 (3-2, First Term; 2-0, Second Term). The pharmacological action of drugs selected for their physiological and clinical significance. Basic pharmacological principles as applied to representative drugs having their primary actions on various organ systems of the body. Classes of drugs studied include general and local anaesthetics; hypnotics, sedatives, and anti-convulsants; analgesics; central nervous system stimulants; autonomic and curariform drugs; histamine and anti-histaminics; cardiovascular drugs; diuretics; heavy metals and their antagonists; haemostatic agents and anticoagulants; and chemotherapeutic agents. Claims for new drugs are critically evaluated. Written reports covering original work are required.
PMCOL 431. *Basic Pharmacology.* See listing under Faculty of Pharmacy.
PMCOL 470. *Basic Pharmacology.* See listing under Faculty of Dentistry.

## 124.13.2 / GRADUATE COURSES

PMCOL 501. *Tutorial and Reading Course.*
PMCOL 502. *Methodology in Pharmacology.*
PMCOL 503. *Bioassays.*
PMCOL 504. *Pharmacological Aspects of Autonomic Transmitter Substances.*
PMCOL 505. *Relationship between Chemical Structure and Pharmacological Activity.*
PMCOL 506. *Neuropharmacology.*
PMCOL 600. *Pharmacology Seminar.*
PMCOL 601. *The Actions of Drugs on Membrane Potentials and Ion Fluxes of Smooth Muscle.*
PMCOL 602. *Research Methods in Clinical Pharmacology.*

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# 124.14 / *Physiology*

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## 124.14.1 / UNDERGRADUATE COURSES

PHSYL 260. *Basic physiology.* See listing under Faculty of Physical Education and School of Nursing.
PHYSL 261. *Basic physiology.* See listing under School of Rehabilitation Medicine and Medical Laboratory Science program.
PHYSL 361. *Basic physiology.* See listing under Faculties of Pharmacy, Household Economics, Arts and Science.
PHYSL 401. *Basic physiology.* See listing under Faculty of Arts and Science.
PHYSL 410. *Basic physiology.* The same lectures as Medical physiology 411 without the laboratory. This is provided primarily for Honors students in Biochemistry and for Graduate Students in related disciplines.
PHYSL 411. *Human Physiology.* ♦8 (3-4). A comprehensive lecture and laboratory course in mammalian and human physiology. Instructors: M. Schachter and staff.
PHYSL 451. The same lectures as Medical physiology 411 but with separate laboratory and demonstration classes.
PHYSL 463. The same lectures as Medical physiology 411 but shortened to the Arts and Science terms. Available to special students in latter Faculties.

## 124.14.2 / GRADUATE COURSES

PHYSL 502. *Problems in Current Research.*
PHYSL 503. *Topics in Biophysics.*
PHYSL 504. *Adrenal Cortex and Gonads.*
PHYSL 506. *Tutorial and Seminar Course.*
PHYSL 507. *Temperature Regulation.*
PHYSL 509. *Respiratory Physiology.*
PHYSL 600. *Physiology Seminar.*

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# 124.15 / *Psychiatry*

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## 124.15.1 / UNDERGRADUATE COURSE

PSYCI 445. *Clinical Clerkship.* ♦8 (four weeks, 0-36c). Experience in the clinical practice of psychological medicine is gained through three weeks spent in the Department of Psychiatry of the University Hospital or the Royal Alexandra Hospital and one week at a provincial mental hospital. Review lectures cover the basic sciences most relevant to psychological medicine. Textbooks: Freedman and Kaplan, *A Comprehensive Textbook of Psychiatry;* Mobray and Roger, *Psychology in Relation to Medicine;* Noyes and Kolb, *Modern Clinical Psychiatry* (sixth edition); Mayer-Gross, Slater, and Roth, *Clinical Psychiatry;* Weiss and English, *Psychosomatic Medicine;* Gregory, *Psychiatry—Biological and Social;* Engel, *Psychological Development in Health and Disease;* Anderson, *Psychiatry;* Russell Davis, *Introduction to Psychopathology.*

### 124.15.2 / GRADUATE TRAINING

A full residency program leading to specialist qualifications in Psychiatry is offered in affiliated hospitals and institutions.

## 124.16 / *Radiology*

### 124.16.1 / UNDERGRADUATE COURSE

RADIO 421. *Introduction to Radiology.* ♦nil (1-0).

### 124.16.2 / GRADUATE TRAINING

A full residency program in diagnostic radiology and a two-year program in therapeutic radiology are offered in affiliated hospitals.

## 124.17 / *Surgery and Clinical Surgery*

### 124.17.1 / UNDERGRADUATE COURSES

APP ANAT 421. *Surgical Anatomy.* ♦4 (1½-0).

OPHTH 431. *Ophthalmology and Oto-Laryngology.* ♦nil (1-0).

SURG 435. *Clinical Surgery.* ♦8 (one trimester, 0-27c). (i) Theatre clinics: Thirty-two one-hour clinics will be presented during the year by the Department of Surgery, sometimes in conjunction with other departments. In addition, there will be a one-hour lecture on Surgical Physiology each week during the trimester. (ii) Lecture-Demonstrations: There will be a one-hour lecture-demonstration in surgical radiology, conducted in co-operation with the Department of Radiology, each week during the trimester. (iii) Tutorials: Ten two-hour tutorials on basic surgical topics will be presented during the trimester. (iv) Clinics: There will be six hours of clinical instruction per week in General Surgery, and four hours in Surgical Specialties, conducted by the Department of Surgery at affiliated hospitals. (v) Ward Work: Eleven hours per week of ward work, including time for reading, will be carried out under supervision at affiliated hospitals. (vi) Professorial conferences: there will be a one-hour professorial conference each week, for discussion of topics of general interest. Instructors: R. A. Macbeth and staff.

SURG 434. *Principles of Surgery.* See description under Faculty of Dentistry.

SURG 445. *Clinical Clerkship.* ♦8 (eight weeks, 0-36c). Clinical clerkship in the wards and the Out-Patient Department of affiliated hospitals and in the Out-Patient Department. The teaching program varies somewhat from hospital to hospital but includes ward work, bedside clinics, specialty clinics, and tutorials. (i) Clinics: There will be approximately fourteen hours per week of clinical instruction in General Surgery and ten hours per week in Surgical Specialties, including Ophthalmology and Oto-Laryngology. In addition there will be weekly ward walks with preceptors, sectional rounds, and out-patient clinics. (ii) Ward Work: ten to twelve hours per week. (iii) Tutorials: Six two-hour tutorials on selected surgical topics. Instructors: R. A. Macbeth and staff.

### 124.17.2 / GRADUATE COURSE AND TRAINING

SURG 500. *Experimental Surgery.* ♦3 (either term, 0-3).

Full residency programs in General Surgery, Neurosurgery, Ophthalmology, Orthopaedic Surgery, Oto-Laryngology, Thoracic and Cardiovascular Surgery, and Urology are offered in affiliated hospitals.

## 124.18 / *Courses in the Medical Laboratory Science Program*

### 124.18.1 / FIRST-YEAR COURSES

BIOL 130. *Introductory Biology.* ♦6 (3-3). Note: Not open to students with credit in Biology 30.

BIOL 230. *Intermediate Biology.* ♦6 (3-3). Prerequisite: Biology 30 or Biology 130. Note: Designed for students with High School Biology 30.

CHEM 230. *Inorganic Chemistry.* ♦6 (3-1s-3). The fundamental concepts of Chemistry as applied to the elements and their compounds. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

CHEM 250. *Organic Chemistry.* ♦6 (3-1s-3). Introduction to a study of the compounds of carbon. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent. Notes: Students with credit in Chemistry 230 normally will proceed to Chemistry 350, not 250. Students not concurrently taking Chemistry 230 are required to take the one-hour seminar.

ENGL 200. *A Survey of English Literature from Chaucer to the Twentieth Century.* ♦6 (3-0). A close study of representative masterpieces. Essays and tests on the prescribed literature to afford practice in setting down ideas in good English.

ENGL 210. *Eglish Language and Literature.* ♦6 (3-0). Designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

PHYSL 261. *Elementary Human Physiology.* ♦6 (3-3). Lectures and laboratory work relating to human physiology. Note: For students in Medical Laboratory Science and Rehabilitation Medicine.

### 124.18.2 / SECOND-YEAR COURSES

BACT 361. *Pathogenic Bacteriology.* ♦6 (3-3). The relation of bacteria, viruses, fungi, and protozoa to disease. The isolation and identification of bacteria pathogenic to man. Bacterial infections, resistance, and immunity. Comparative bacteriology. Note: In 1968-69 this course is available only to students in Medical Laboratory Science; other students interested in the subject should seek admission to Bacteriology 421. Instructors: S. R. Toshach, Y. Goodmon, and staff.

BIOCH 400. *Clinical Biochemistry.* ♦5 (2-3). Principles of instrumentation; quality control; clinical chemistry of blood and urine; gastric, kidney, and liver function tests; disturbances of acid-base, electrolyte, and mineral metabolism. Emphasis on critical appraisal of biochemical methods as applied to the study of disease. Prerequisites: Chemistry 230 and 250. Instructors: H. B. Collier and D. J. Campbell.

CLIN PATH 361. *Clinical Pathology.* ♦6 (3-6). Lectures: the use and interpretation of laboratory methods as diagnostic aids. Laboratory: exercises to develop a high degree of accuracy and reasonable speed in haematological and other clinical pathological procedures used in modern hospital laboratories. Prerequisite: Physiology 261. Note: Because the laboratory work in this course is integrated with that in other medical laboratory disciplines, registration is restricted to Medical Laboratory Science students. Instructors: H. E. Bell and J. Matheson.

PHYS 100. *Introductory General Physics.* ♦6 (3-3). Basic principles of Physics, illustrated by experiments. Note: Designed for students lacking Grade XII Physics. A terminal course which does not fulfill prerequisite requirements for senior Physics courses.

PHYS 200. *General Physics.* ♦6 (3-3). Fundamentals of Physics, including mechanics, properties of matter, heat, sound, electricity, and light, illustrated by experiments. Prerequisite: Physics 30 or 100.

NOTE: University credit may be granted for only one of Physics 100 and 200.

## 124.18.3 / THIRD-YEAR COURSES

BIOCH 300. *General Biochemistry.* ♦6 (3-3). Structure and chemistry of the cell; the chemistry and metabolism of carbohydrates, lipids, proteins and nucleic acids; the molecular biology of enzymes and genes as related to the functioning of the living cell. Prerequisite: Chemistry 230 and 250.

BIOCH 372. *Topics in Biochemistry.* ♦6 (3-1s-3). The topics of Biochemistry 300 discussed in a more rigorous manner. Seminars on current research in biochemistry and molecular biology. Prerequisites: Chemistry 230 and 250. Chemistry 370 or 372 and Mathematics 201 desirable as prerequisites or corequisites. Note: Designed for honors students, graduate students, and selected students from all departments.

PATH 400. *Medical Laboratory Science.* (Twelve months). A year spent in rotation in the following hospital departments: bacteriology, clinical chemistry, haematology, blood banking, and histology. Lectures, tutorials, weekly conferences, and semi-monthly seminars, followed by a comprehensive theoretical and practical examination. Instructors: R. E. Bell, H. E. Bell, D. J. Campbell, and staff.

## 124.18.4 / FOURTH-YEAR COURSES

BIOCH 401. *Clinical Biochemistry.* ♦2 (2-0). Advanced lectures on special topics, including: acid-base balance, electrolytes, and minerals; lipids; plasma proteins; hemoglobin chemistry; liver and kidney function; gastrointestinal tract; enzymes and inborn errors of metabolism; steroids. Prerequisite: Biochemistry 300, 372, or 400. Instructor: H. B. Collier.

CHEM 312. *Quantitative Analysis.* ♦6 (3-6). Prerequisite: Chemistry 230 or 232.

PATH 401. *Medical Laboratory Science.* ♦6 (3-6). Lectures, seminars, and laboratory exercises on the approach and method of investigation of selected medical laboratory problems; laboratory planning and administration; the use of special equipment and techniques. Instructors: H. E. Bell, D. J. Campbell, H. B. Collier, and staff.

*Miss R. E. McClure, Director of the School of Nursing.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# School of Nursing

## 131 / INTRODUCTORY

### 131.1 / *Members of the School*

#### 131.1.1 / STAFF

*Professor and Director*
(Miss) R. E. McCLURE, M.P.H.

*Associate Professor*
(Mrs.) M. JACKSON, M.P.H. (Public Health Nursing)

*Assistant Professors*
(Miss) M. BESWETHERICK, M.Sc. (Nursing Service)
(Miss) P. A. FIELD, M.N. (Maternal-Child Health Nursing)
(Miss) B. HARRINGTON, M.N. (Public Health Nursing)
(Mrs.) A. McKINNON, M.N. (Nursing Education)
(Miss) S. STINSON, M.N.A. (on leave of absence)

*Lecturers*
(Miss) J. ALLEN (Obstetrics)
(Miss) I. BELL, B.Sc. (Medical-Surgical Nursing)
(Miss) B. DOBBIE, B.N. (Maternal-Child Health Nursing)
(Mrs.) G. C. GEHLERT, B.Sc.
(Mrs.) G. NAKONECHNY, B.Sc. (Medical-Surgical Nursing)
(Mrs.) M. J. SANDILANDS, B.Sc.
(Miss) G. TANNAHILL, B.Sc. (Nursing Fundamentals)
(Miss) E. VINGE, B.S.N. (Public Health Nursing)

*Lecturers (Sessional)*
(Mrs.) A. BAUER, B.Sc. (Medical-Surgical Nursing)
(Mrs.) J. BAIRD, C.A.P.O. (Obstetrical Nursing)
(Mrs.) B. GEYER, B.Sc. (Obstetrical Nursing)

#### 131.1.2 / ADDITIONAL MEMBERS OF THE SCHOOL COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Dean of the Faculty of Medicine*
W. C. MacKENZIE, M.D.

*Professor*
G. NETTLER, Ph.D. (Sociology)

*Associate Professors*
J. HOLMES, Ph.D. (Zoology)
E. RATSOY, B.Sc., B.Ed. (Educational Administration)

*Executive Director, University Hospital*
B. SNELL, M.D.

*Director of Nursing, University Hospital*
(Miss) M. G. PURCELL, R.N.

*Executive Director, Alberta Association of Registered Nurses*
(Mrs.) H. SABIN, R.N.

*Registrar of the University*
A. D. CAIRNS, B.A.

### 131.2 / *General Information*

#### 131.2.1 / HISTORICAL NOTE

The School of Nursing was established under the Faculty of Medicine on September 28, 1923. At that time two programs were developed: a five-year program leading to the degree Bachelor of Science in Nursing, and a three-year program leading to the Diploma in Nursing.

In 1954 at the request of the University Hospital, the diploma program was transferred from the University and placed under the jurisdiction of the University Hospital Board.

Although many revisions in the five-year degree program had taken place since its inception, the clinical portion of the program continued to be offered through affiliation with the University Hospital until 1966 when the four-year integrated program under the direct control of The University of Alberta was implemented.

The School of Nursing has for many years offered separate programs for Registered Nurses; the program leading to the Diploma in Public Health Nursing instituted in 1939; the program leading to the Diploma in Teaching and Supervision in Schools of Nursing in 1946 and the degree program (post-basic) in 1952. Since 1943 a five-month program leading to the Certificate in Advanced Practical Obstetrics has been offered.

In 1966, after the new *Universities Act* came into effect, the School of Nursing, by action of the General Faculty Council, became an autonomous school.

#### 131.2.2 / AIMS AND OBJECTIVES

The general aim of the School of Nursing is to provide the kinds of learning experiences that will assist selected candidates in developing competence in nursing and the

ability to assume responsibility and leadership in meeting the nursing needs of a changing society.

The School's specific objectives are to engender in the Nursing student:

(1) the ability to provide nursing care based on understanding to the physical, emotional, spiritual, and social needs of the individual and the family;

(2) the ability to establish effective and satisfying relationships with individuals and groups based on an understanding of self and acceptance of others;

(3) the ability to use the problem-solving method in making sound judgment in the practice of nursing;

(4) the ability to plan, direct, and evaluate patient care in co-operation with other members of the health team;

(5) an understanding of professional privileges and obligations and a desire to participate in the activities of the professional organization;

(6) the ability to contribute to society through an increasing degree of emotional, social, and professional maturity.

### 131.2.3 / UNDERGRADUATE PROGRAM

The aims of the basic four-year program leading to the degree of Bachelor of Science in Nursing are (1) to prepare young men and women to practise nursing in community health agencies, and to assume leadership positions—team leader, assistant head nurse, assistant nursing instructor, and staff public health nurse; and (2) to provide a foundation for continuing professional growth and for graduate study in nursing.

During the two Summer Session periods of study in this program the student will receive an honorarium.

### 131.2.4 / PROGRAMS FOR REGISTERED NURSES

(1) *Post-Basic Program leading to the degree Bachelor of Science in Nursing.* The program of studies includes courses in biological, physical, and social sciences, and general education, and is designed to prepare Registered Nurses for positions in hospital and health agencies.

Courses required for the first year of the program may be taken at the Universities of Calgary and Lethbridge or at some junior colleges in Alberta.

(2) *Program leading to the Diploma in Public Health Nursing.* A program designed to offer Registered Nurses basic preparation for positions as staff nurses in official and voluntary health agencies.

(3) *Program leading to the Diploma in Teaching and Supervision in Schools of Nursing.* A program designed to assist Registered Nurses to function more effectively in supervisory and teaching positions.

(4) *Program leading to the Certificate in Advanced Practical Obstetrics.* A program of instruction and clinical experience for Registered Nurses interested in preparing for positions of responsibility in obstetrical nursing.

NOTE: After the 1969-70 academic year the one-year diploma programs in Public Health Nursing and Teaching and Supervision will be discontinued and will be replaced by a revised degree program for Registered Nurses. Those who have completed the Diploma programs in Teaching and Supervision or Public Health Nursing by 1970 will be given until September 1973 to complete requirements for the degree under the present degree program for Registered Nurses.

# 132 / SCHOOL REGULATIONS

## 132.1 / *Admission*

### 132.1.1 / REQUIREMENTS FOR BASIC B.SC. PROGRAM

The requirements for admission to the basic program leading to the degree of B.Sc. in Nursing are set out in §§ 13.1 and 13.13 of the University Regulations section of the Calendar.

NOTE: Until 1970, when the last class of the five-year degree program will graduate, enrolment in the basic program will be limited to between twenty and twenty-five students.

### 132.1.2 / REQUIREMENTS FOR PROGRAMS FOR REGISTERED NURSES

In addition to possessing the academic qualifications specified in §§ 13.1 and 13.13 of the University Regulations section of the Calendar, the applicant must be a Registered Nurse from an approved diploma program with satisfactory clinical experience, including psychiatric nursing.

In exceptional circumstances, consideration may be granted, on an individual basis and on consultation with the Student Counselling Services, to an applicant who presents evidence of professional competence and ability to profit from University study.

The student is required to complete at least one year, normally the final year, as a full-time intramural student in the School of Nursing of The University of Alberta.

## 132.2 / *Academic Standings and Graduation*

(1) In the basic degree program, for promotion in the first three years a student is required to pass all courses with a grade of at least 4 and attain a grade-point average of 4.5 in each year. For graduation, a grade-point average of 4.5 in the fourth year and an over-all grade-point average of 5.0 is required.

(2) If a grade of 3 is obtained in a course, credit may be granted if the required grade-point average for the year has been achieved and if the course is not a prerequisite to another course in the student's program. Only two grades of 3 may be permitted in the entire program.

(3) In the programs for Registered Nurses the student must pass all courses with a grade of at least 4 and attain a grade-point average of 5.0 for graduation. Only one grade of 3 may be permitted in the entire program if the conditions as listed above are met.

(4) A student who has unexcused absences totalling one-eighth or more of the total number of lectures in any course may be refused permission to write the final examination.

(5) A student may not proceed to work in the next year without having completed satisfactorily the clinical experience and field work as outlined in this Calendar.

# 133 / PROGRAMS OF STUDY

## 133.1 / *The Degree of B.Sc. in the Basic Program*

*First Year*
English 200 or 210
Sociology 202
Psychology 202
Physiology 260
Bacteriology 233
Nursing 211
Nursing 230
Nursing 241 (month of May)
Physical Education 228

*Second Year*
Chemistry 250
Approved Psychology (one term)
Approved option (one term)
Nursing 341
Nursing 351
Nursing 352 (two summer months)

*Third Year*
Approved option
Vocational Education 479
Business 300
Nursing 361
Nursing 371
Nursing 372 (two summer months)

*Fourth Year*
Approved Senior option
Approved Senior Psychology or Sociology
Psychology 309
Nursing 404
Nursing 457
Nursing 422
Nursing 462

## 133.2 / *The Degree of B.Sc. in the Post-Basic Program for Registered Nurses*

*First Year*
English 200 or 210
Psychology 200, 212 or Educational Psychology 269 and 271
Chemistry 250
Biology 130 or 230
Sociology 202

*Second Year*
Bacteriology 441
Vocational Education 479
Nursing Education 453
Nursing Education 451
Senior Psychology (one term)
Senior Psychology or Sociology
Senior option
Required courses in *either* Nursing Education *or* Public Health

One of the following two groups of courses is to be included in the second-year program:

*Nursing Education*
Nursing Education 454
Nursing Education 456
Public Health 411
Nursing Education 460

*Public Health*
Public Health 400
Public Health 402
Public Health 406
Public Health 460
Nursing Education 411

Because of the heavy course load in the final year, it is recommended that one course be taken at Summer Session.

### 133.3 / *The Diploma in Public Health Nursing*

Bacteriology 441
Vocational Education 479
Psychology 202, 212 or Educational Psychology 269 and 271
Sociology 202
Public Health Nursing 400
Public Health Nursing 402
Public Health Nursing 406
Public Health Nursing 460
Nursing Education 451
Nursing Education 453
Nursing Education 411

### 133.4 / *The Diploma in Teaching and Supervision in Schools of Nursing*

Bacteriology 441
Vocational Education 479
Psychology 202, 212 or Educational Psychology 269 and 271
Sociology 202
Nursing Education 451
Nursing Education 453
Nursing Education 454
Nursing Education 456
Nursing Education 460
Public Health 411

### 133.5 / *The Certificate in Advanced Practical Obstetrics*

*Courses*

ON 35. (Principles of Obstetrics and Management of Labor)
ON 35A. (The Care of the Obstetrical Patient)
ON 35B. (Principles of Teaching and Supervision in Obstetrical Nursing)

*Clinical Experience*

(1) Concurrent supervised experience in antepartum, intrapartum and postpartum care of patients and in the care of the normal infant.

(2) Supervised experience in the premature nursery.

(3) Seven weeks observation and supervised clinical experience in selected obstetrical units throughout the province.

Each student must deliver, under medical supervision, a minimum of twenty cases.

# 134 / DETAILS OF COURSES

### 134.1 / *General Information*

Courses open to students in the School of Nursing are listed here in alphabetical order, whether they are offered by the School of Nursing or by another faculty or school.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Following the title of the course is the symbol "♦" standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages. An ordinary full-year course is weighted 6. A half-course is normally weighted 3. Some honors and graduate courses involving research may vary in weight according to the length and difficulty of the research project. Some courses are offered for credit only, and carry no weight.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours, respectively, required by the course in a week. Where they appear, the symbol "s" denotes seminar hours, the symbol "c" denotes clinic hours, and the symbol "L" denotes combined lecture-laboratory hours. The expression "3/2" means three hours of instruction every second week. The hours of instruction for a full course are the same in both terms unless otherwise indicated. If the course is a half-course, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

### 134.2 / *Bacteriology*

Faculty of Medicine

BACT 233. *Bacteriology*. ♦2 (Second Term, 2-3). An introduction to the micro-organisms of man and his environment.

BACT 441. *Bacteriology*. ♦2 (First Term, 2-3). The relation of bacteria to individual and community health. A study of infection and resistance in man and of methods of diagnosis and control of infectious disease.

## 134.3 / *Biology*

BIOL 130. *Introductory Biology.* ♦6 (3-3). Note: Not open to students with credit in Biology 30.
BIOL 230. *Intermediate Biology.* ♦6 (3-3). Prerequisite: Biology 30 or Biology 130. Note: Designed for students with High School Biology 30.

## 134.4 / *Chemistry*

CHEM 250. *Organic Chemistry.* ♦6 (3-1s-3). Introduction to a study of the compounds of carbon. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent. Notes: Students with credit in Chemistry 230 normally will proceed to Chemistry 350, not 250. Students not concurrently taking Chemistry 230 are required to take the one-hour seminar.

## 134.5 / *Educational Psychology*

ED PSY 269. *Introduction to Educational Psychology —Maturation and Development.* ♦3 (3-0).
ED PSY 271. *Introduction to Educational Psychology —Learning.* ♦3 (3-0).

## 134.6 / *English*

ENGL 200. *A Survey of English Literature from Chaucer to the Twentieth Century.* ♦6 (3-0). A close study of representative masterpieces. Essays and tests on the prescribed literature will be given to afford practice in setting down ideas in good English.
ENGL 210. *English Language and Literature.* ♦6 (3-0). English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

## 134.7 / *Nursing*

NURSING 211. *Human Anatomy.* ♦2 (First Term, 2-2). A systematic study of the structural basis of the body.
NURSING 230. *Fundamentals of Nursing.* ♦6 (3-2; 3-3). Lectures, conferences and hospital experience designed to promote the development of basic nursing skills and interpersonal relations.
NURSING 241. *Fundamentals of Nursing.* ♦3 (one month, 10-20c). Planned experience in the comprehensive care of patients with chronic or long term illness with emphasis on rehabilitation nursing.
NURSING 341. *Medical-Surgical Nursing.* ♦9 (First Term, 6-20c). Lectures, conferences and concurrent experience designed to extend basic nursing skills to the care of adults with major health problems. Prevention and rehabilitation is emphasized. Prerequisite: Nursing 230 and 241.
NURSING 351. *Maternal and Child Health I.* ♦9 (Second Term, 6-20c). Introduction to the physiological, psychological, and sociological aspects inherent in the growth and development of the family. The contribution of persons in allied health fields.
NURSING 352. *Maternal and Child Health II.* ♦9 (two months, summer following second year, 10-30c). Lectures, seminars, and concurrent experience to develop skills basic to family-centred mother and child nursing. Prerequisite: Nursing 351.
NURSING 361. *Psychiatric Nursing.* ♦9 (either term, 3-20c). Nursing of the mentally ill based on knowledge of behavior as related to human needs, and of the causes of personality disorders. Emphasis on the therapeutic nature of communication.
NURSING 371. *Medical-Surgical Nursing.* ♦9 (either term, 6-20c). Planned experience to promote increasing ability to make nursing judgments concerning the care of patients with complex health problems. Prerequisite: Nursing 341.
NURSING 372. *Medical-Surgical and Psychiatric Nursing.* ♦6 (two months, summer following third year, 10-30c). Lectures and concurrent experience in applying psychiatric concepts to patient care with emphasis on the intensive care of the acutely ill and totally dependent patient.
NURSING 404. *Community Health.* ♦6 (3-0). A continuation of the study of nursing care with an emphasis on the role and functions of the nurse in organized health services. Analysis of present day health problems and programs.
NURSING 422. *Professional Nursing Trends.* ♦6 (3-0). Lectures and conferences to promote an appreciation of the historical development of the nursing profession and of present day trends. Emphasis on the responsibilities associated with membership in the nursing profession.
NURSING 457. *Process of Developing Educational Programs.* ♦3 (First Term, 3-0). Application of teaching-learning theory to the development of educational programs in nursing.
NURSING 462. *Community Health Experience.* ♦6 (0-8). Conferences and concurrent experience focussing upon the application of concepts of administration, education, and public health.

## 134.8 / *Nursing Education*

N ED 451. *Current Trends in Nursing.* ♦2 (Second Term, 2-0). Progress and trends in nursing as influenced by forces within and outside the profession. An introduction to statistics.
N ED 453. *Practice Teaching.* ♦0 (Second Term, 0-2).
N ED 454. *Hospital Nursing Service Administration.* ♦6 (3-0; 3-2s). The application of the basic principles of administration to Hospital Nursing Service with particular emphasis on effective Nursing Unit Management.
N ED 456. *The School of Nursing.* ♦6 (3-0; 3-2c). Foundations of nursing education. Principles and methods of curriculum development.
N ED 411. *Introduction to Hospital Nursing Service Administration.* ♦2 (First Term, 2-2). An introduction to the basic principles of administration with particular application to Hospital Nursing Service Administration, emphasizing the relationship between administrative practices and improved patient care. Visits to community agencies.
N ED 460. Credit (one month of field work in selected hospitals.

## 134.9 / *Obstetrical Nursing*

ON 35. *Principles of Obstetrics and Mechanisms of Labour.* (First Term, 6-0.) The physiology and management of normal and abnormal pregnancy; theory and management of labour and delivery; principles underlying the administration of anaesthesia and analgesia; gynaecological conditions; the menopause.

ON 35A. *The Care of the Obstetrical Patient.* (First Term, 13-12c.) Lectures, tutorials and concurrent field experience in ante-, intra-, and post-partum care.

ON 35B. *Infant Care.* (First Term, 1-0.) The care of the normal and premature infant during the neonatal period.

ON 35C. *Principles of Teaching and Supervision in Obstetrical Nursing.* (First Term, 2-1c.) The principles of teaching and supervision; their application in nursing service and nursing education. Practice in public speaking and supervised teaching.

## 134.10 / *Physical Education*

Faculty of Physical Education

PHYS ED 218. *Activity Course—Men.* ♦0 (0-2). Tests in fitness and aquatics in the First Term, followed by student-selected recreational activities. Note: Course required of all first-year men.

PHYS ED 228. *Activity Course—Women.* ♦0 (0-2). Foundations of Physical Education with emphasis on fitness, followed by two electives in recreational activities. Note: Course required of all first-year women.

## 134.11 / *Physiology*

PHYSL 260. *Introductory Human Physiology.* ♦6 (3-1). Lectures on human physiology; laboratory demonstrations designed to illustrate important aspects of the subject using modern techniques. Note: For students in the Basic program in Nursing and in Physical Education.

## 134.12 / *Psychology*

PSYCO 202. *Introduction to General Psychology.* ♦6 (3-0). A survey of problems, methods, and principles in various fields of psychology.

PSYCO 212. *General and Developmental Psychology.* ♦6 (3-0). A survey of problems, methods, and principles in various fields of psychology, with particular emphasis on child, adolescent, and adult development and behavior.

PSYCO 309. *Statistical Methods for Psychological Research.* ♦3 (either term, 3-3).

PSYCO 353. *Developmental Psychology.* ♦3 (either term, 3-0). Prerequisite: 202 or consent of the Department.

For descriptions of further courses in Psychology see the Arts and Science sections of the Calendar.

## 134.13 / *Public Health*

PH 400. *Public Health Nursing.* ♦6 (3-0; 3-2s). Trends and developments in preventive medicine; the organization and administration of public health services; the role of the nurse in public health services; the fundamental principles of public health nursing. Observation and practice in selected community health agencies.

PH 402. *Epidemiology.* ♦3 (2-0; 1-0). The factors contributing to states of health and disease; methods of control and prevention of disease in the community.

PH 406. *Maternal and Child Health.* ♦3 (2-0; 2-2). Modern concepts of maternal and child care with emphasis on the nurses' role in promoting sound physical and emotional health for the mother and child.

PH 411. *Introduction to Public Health Nursing.* ♦2 (First Term, 2-2). Principles of Public Health Nursing; the role of the nurse in Public Health services with emphasis on co-operation between Public Health and hospital services in the community. Visits to community agencies.

PH 460. ♦0. One month of field work in selected health agencies.

## 134.14 / *Sociology*

SOC 202. *Introductory Sociology.* ♦6 (3-0). An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society analysed in terms of its structure, culture and social ranking schemes. The interrelationships between the various institutions (e.g. family, church, school, government). The processes whereby the individual is socialized into society; the sources of conformist and non-conformist behavior. Note: Third year or more advanced students are encouraged to take 403 rather than 202.

For descriptions of senior courses in Sociology see the Arts section of the Calendar.

## 134.15 / *Vocational Education*

ED VOC 479. *Vocational Education.* ♦3 (First Term, 3-0). General principles of teaching and curriculum development in vocational education.

*Dr. M. J. Huston, Dean of the Faculty of Pharmacy.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# *Faculty of Pharmacy*

## 141 / INTRODUCTORY

### 141.1 / *Members of the Faculty*

#### 141.1.1 / STAFF

*Professor and Dean*
M. J. HUSTON, Ph.D. (Biopharmacy)

*Professors*
A. J. ANDERSON, Ph.D. (Pharmaceutics)
L. G. CHATTEN, Ph.D. (Pharmaceutical Chemistry)
G. E. MYERS, Ph.D. (Biopharmacy)

*Associate Professors*
A. F. CASY, Ph.D. (Pharmaceutical Chemistry)
R. T. COUTTS, Ph.D. (Pharmaceutical Chemistry)
N. K. PATEL, Ph.D. (Pharmaceutics)
R. E. MOSKALYK, Ph.D. (Pharmaceutical Chemistry)

*Assistant Professors*
J. N. HLYNKA, Ph.D. (Hospital Pharmacy)
R. A. LOCOCK, Ph.D. (Pharmaceutical Chemistry)
A. A. NOUJAIM, Ph.D. (Bionucleonics)
E. J. TRIGGS, Ph.D. (Biopharmacy)
G. L. WASZILYCSAK, Ph.D. (Bionucleonics)

*Sessional Lecturers*
D. M. CAMERON, B.Sc. (Pharmacy Administration)
W. W. MADAY, B.Sc. (Hospital Pharmacy)

#### 141.1.2 / ADDITIONAL MEMBERS OF THE FACULTY COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Dean of the Faculty of Medicine*
W. C. MacKENZIE, M.D., M.S., F.R.C.S., LL.D.

*Professors*
R. K. BROWN, Ph.D. (Chemistry)
C. W. NASH, Ph.D. (Pharmacology)
L. B. SMILLIE, Ph.D. (Biochemistry)

*Associate Professor*
P. F. MERCER, Ph.D. (Physiology)

*Representative*
W. W. MADAY, B.Sc. (Alberta Pharmaceutical Association)

*Registrar of the University*
A. D. CAIRNS, B.A.

### 141.2 / *Opportunities in Pharmacy*

With the rapid advancement being made in medical science during the present century, pharmacy is becoming a more and more specialized profession. The responsibilities associated with the distribution of drugs and pharmaceutical preparations are constantly increasing as new therapeutic agents are developed. In addition, the importance in the community of the pharmacist as a counsellor on public health matters and as a source of scientific information of a general character is becoming better appreciated by the general public. Educational standards have been advanced to meet these increasing demands and ample scope is provided to the young man or woman who wishes to enter pharmacy as a career.

There is always a demand for well-trained pharmacists and never before have opportunities been so great in pharmacy and its many allied fields. The following are some of the avenues open to qualified pharmacists: as proprietors, managers, and prescription clerks in retail stores; as dispensers in hospital pharmacies; as pharmaceutical and research chemists in manufacturing plants; as manufacturers' or wholesalers' representatives.

*Retail Pharmacy.* Retail pharmacy continues to attract the highest proportion of graduates. Since pharmacy is both a profession and a business this unique combination offers a satisfying and rewarding opportunity for service. The expanding economy of the country, and of Alberta in particular, will continue to provide conditions favorable to success.

*Hospital Pharmacy.* The contribution which the pharmacist can make in the hospital is being more fully realized and his skills more adequately utilized. His duties include the dispensing of prescriptions, control of drugs and other stores and supplies, manufacture of drugs, preparations, parenteral solutions, etc., the compiling and organization of data on recent advances in

pharmacy so as to act as an adviser to nurses and doctors on new developments.

*Public Health Laboratories.* Graduates in pharmacy are well qualified to fill positions in municipal, provincial, and federal health laboratories.

*Manufacturing Pharmacy.* There are many openings in manufacturing firms for pharmacy graduates as pharmaceutical and research chemists. This is particularly true for those graduates who supplement their basic pharmaceutical education with advanced or specialized training. Many graduates, also, find interesting and useful positions as manufacturers' representatives. Association with such firms opens up the possibility of advancement to executive positions.

*Research.* Upon completion of his undergraduate work the capable student finds many possible avenues open to him for graduate work leading to advanced degrees. Such special training equips the student for gratifying positions in research and teaching.

*Women in Pharmacy.* There are many opportunities for women in pharmacy. They find a natural place in hospitals, medical clinics, and in the larger dispensaries. Also, an increasing number of women are entering the field of retail pharmacy and research.

## 141.3 / *Qualifications for Practice in Alberta*

The Bachelor of Science degree in Pharmacy of The University of Alberta is the minimum academic requirement accepted by the Alberta Pharmaceutical Association for the licence to practise pharmacy in the province of Alberta.

Candidates for the course in pharmacy were formerly required to complete twelve months of practical experience before entering the University. This requirement has been withdrawn. In order to register as a pharmacist with the Alberta Pharmaceutical Association a graduate must have completed twelve months of practical experience but this need not be served before university entrance. Information concerning the regulations applying to practical experience in Alberta may be obtained from the Registrar-Treasurer, Alberta Pharmaceutical Association, College of Physicians and Surgeons Building, 9901 - 108th Street, Edmonton, Alberta.

The regulations governing the practice of Pharmacy in the Province of Alberta are set forth in the Alberta Pharmaceutical Association Act.

# 142 / FACULTY REGULATIONS

## 142.1 / *Admission*

The admission requirements of the Faculty of Pharmacy are set out in §§ 13.1 and 13.14 of the University Regulations section of the Calendar.

## 142.2 / *Academic Standing*

(1) The pass mark in all Pharmacy courses is a grade of 4.

(2) A grade of 3 in a lecture course will normally, but not necessarily, carry a supplemental privilege. Furthermore, a grade of 3 in a course which is not a prerequisite for another course in the student's program may in some instances be approved for credit, depending on the over-all performance of the student.

(3) In case of failure in a Pharmacy laboratory course there is no supplemental privilege and the laboratory course, together with the corresponding lecture course, must be repeated.

## 143.1 / *The Degree of Bachelor of Science in Pharmacy*

### 143.1.1 / GENERAL INFORMATION

All first-degree programs in Pharmacy are four years in length. The first three years of the curriculum are common to all patterns. In the fourth year the student specializes in one of Pharmacy Administration, Hospital Pharmacy, or Pharmaceutical Science.

The Pharmacy curriculum is being revised. The present Calendar lists the new requirements of the first, second, and third years. The new fourth-year requirements will appear in the Calendar for 1969-70. It will be noted that the course in pharmacognosy, formerly offered in the second year, forms part of the revised third-year program. Further information on the revised curriculum may be obtained from the Dean.

All programs of study must be worked out in consultation with members of the Faculty and approved by the Dean. It is desirable that students decide after their first year the area in which they wish to specialize, so that options in the second and third years may be chosen to relate to that area. For example, a student planning to enter the Pharmacy Administration program might select courses in Economics and Commerce; one planning to enter Hospital Pharmacy might select courses in Biochemistry and Microbiology; one planning to enter the Pharmaceutical Sciences program might select Mathematics, Statistics, or Chemistry.

### 143.1.2 / DEGREES WITH HONORS

The following regulations apply to students who registered in Pharmacy prior to 1966-67.

Students with a grade-point average of 5.5 or better over the second and third years will be eligible to take the fourth year as an Honors Program. Those obtaining a grade-point average of 5.5 or better over the second, third and fourth years will be awarded the degree of Bachelor of Science in Pharmacy with Honors in Pharmacy Administration, or Hospital Pharmacy, or Pharmaceutical Science. Those obtaining a grade-point average of 7.5 or better will be awarded the degree with First Class Honors.

Honors candidates who pass all courses but do not obtain honors standing will be granted a degree with a Major in the Specialty.

### 143.1.3 / DEGREES WITH MAJOR

The following regulations apply to students who registered in Pharmacy before 1966-67.

Students with satisfactory records but with less than a 5.5 average over the second and third years will be eligible to take the fourth year as a Major Program. Successful candidates will be awarded the degree of Bachelor of Science in Pharmacy with Major in Pharmacy Administration, or Hospital Pharmacy or Pharmaceutical Science.

### 143.1.4 / TRANSFER FROM OTHER INSTITUTIONS

Students wishing to take a first year at another institution should select the non-Pharmacy courses of first year and add Physics from the second year. Transferees will be admitted to second-year Pharmacy to the extent that space and facilities permit.

### 143.1.5 / PROGRAM OF COURSES

| | *First Term Hours* | *Second Term Hours* |
|---|---|---|
| *First Year* | | |
| BIOL 230 (or 130 for those without credit in Biology 30) (Biology) | 3-3 | 3-3 |
| CHEM 230 (Chemistry) | 4-3 | 4-3 |
| CHEM 250 (Organic Chemistry) | 3-3 | 3-3 |
| PHARM 210 (Introductory Pharmacy) | 3-0 | 3-0 |
| PHARM 211 (Laboratory to above) | 0-3 | 0-3 |
| ENGL 210 (English) | 3-0 | 3-0 |
| PHYS ED 218 (men) or 228 (women) | 0-2 | 0-2 |
| *Second Year* | | |
| MICRB 360 (Microbiology) | 3-3 | 3-3 |
| PHARM 310 (Physical Pharmacy) | 2-0 | 2-0 |
| PHARM 311 (Laboratory to above) | 0-3 | 0-3 |
| PHARM 326 (Introduction to Medicinal Chemistry) | 3-0 | — |
| PHARM 329 (Qualitative Analysis of Organic Medicinals) | — | 1-3 |
| PHYSL 361 (Physiology) | 3-3 | 3-3 |
| PHYSICS 200 (or 100 for those without Grade XII Physics) | 3-3 | 3-3 |
| An approved option in the Humanities or Social Sciences | 3-0 | 3-0 |
| *Third Year* | | |
| BIOCH 300 (Biochemistry) | 3-3 | 3-3 |
| PMCOL 431 (Pharmacology) | 2-3 | 2-3 |
| PHARM 410 (Dispensing Pharmacy) | 3-0 | 3-0 |
| PHARM 411 (Laboratory to above) | 0-3 | 0-3 |
| PHARM 424 (Pharmacognosy) | 3-0 | 3-0 |
| PHARM 426 (Medicinal Chemistry) | 3-0 | 3-0 |
| PHARM 428 (Pharmaceutical Analysis) | 2-0 | 2-0 |
| PHARM 429 (Laboratory to above) | 0-3 | 0-3 |

*Analyzing drug compounds using an infrared spectrophotometer.*

| | First Term Hours | Second Term Hours |
|---|---|---|
| *Fourth Year— Hospital Pharmacy* | | |
| PHARM 442 (Advanced Pharmaceutics) | 1-0 | 1-0 |
| PHARM 443 (Laboratory to above) | 0-3 | 0-3 |
| PHARM 444 (Pharmaceutical Therapeutics) | 3-0 | 3-0 |
| PHARM 446 (Hospital Pharmacy) | 1-0 | 1-0 |
| PHARM 447 (Laboratory to above) | 0-4 | 0-4 |
| PHARM 449 (Thesis) | 1s-3 | 1s-3 |
| Two approved options from Pharmacy, Science, or Business | | |
| *Fourth Year— Pharmaceutical Science* | | |
| PHARM 440 (Advanced Pharmaceutical Analysis) | 3-0 | 3-0 |
| PHARM 441 (Laboratory to above) | 1s-3 | 1s-3 |
| PHARM 449 (Thesis) | 1s-3 | 1s-3 |
| Three approved options from Mathematics, Statistics, Chemistry, Biochemistry, Physiology, Pharmacy, or other science | | |
| *Fourth Year— Pharmacy Administration* | | |
| ACCTG 202 (Accounting) | 3-2 or | 3-2 |
| ACCTG 204 (Management) | 3-2 or | 3-2 |
| PHARM 444 (Pharmaceutical Therapeutics) | 3-0 | 3-0 |
| PHARM 449 (Thesis) | 1s-3 | 1s-3 |
| PHARM 492 (Pharmacy Management) | 3-0 | — |
| PHARM 494 (Pharmacy Marketing) | — | 3-0 |
| VET SCI 404 (Veterinary Science) | 3-0 | — |
| Three approved options from Economics, Commerce, senior Pharmacy or Science | | |

## 143.2 / *Graduate Study*

Students may undertake graduate study in pharmacy leading to the degree of M.Sc. or Ph.D. Any students contemplating such work should discuss their program with the Dean of the Faculty of Pharmacy. They should also familiarize themselves with the regulations and procedures laid down by the Faculty of Graduate Studies. These may be found in the Faculty of Graduate Studies section of the Calendar.

Students planning to begin graduate work should make application, not later than the date set in the Academic Schedule, for admission to the Faculty of Graduate Studies. Applications should be addressed to the Dean, Faculty of Graduate Studies.

# 144 / DETAILS OF COURSES

## 144.1 / *General Information*

Courses open to students in the Faculty of Pharmacy are listed here in alphabetical order, whether they are offered by the Faculty of Pharmacy or by another faculty or school.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Following the title of the course is the symbol "♦" standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages. An ordinary full-year course is weighted 6. A half-year course is normally weighted 3. Some honors and graduate courses involving research may vary in weight according to the length and difficulty of the research project. Some courses are offered for credit only, and carry no weight.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours, respectively, required by the course in a week. Where they appear, the symbol "s" denotes seminar hours, the symbol "c" denotes clinic hours, and the symbol "L" denotes combined lecture-laboratory hours. The expression "3/2" means three hours of instruction every second week. The hours of instruction for a full course are the same in both terms unless otherwise indicated. If the course is a half-course, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 144.2 / *Biochemistry*

BIOCH 300. *General Course.* ♦6 (3-3). Structure and chemistry of the cell; the chemistry and metabolism of carbohydrates, lipids, proteins, and nucleic acids; the molecular biology of enzymes and genes as related to the functioning of the living cell. Prerequisites: Chemistry 230 and 250.

BIOCH 372. *Topics in Biochemistry.* ♦6 (3-1s-3). The topics of Biochemistry 300 discussed in a more rigorous manner. Seminars on current research in Biochemistry and Molecular Biology. Prerequisites: Chemistry 230 and 250. Chemistry 370 or 372 and Mathematics 201 desirable as prerequisites or corequisites. Note: Designed for graduate students, honors students, and selected students from all departments.

## 144.3 / *Biology*

BIOL 130. *Introductory Biology.* ♦6 (3-3). Note: Not open to students with credit in Biology 30.

BIOL 230. *Intermediate Biology.* ♦6 (3-3). Prerequisite: Biology 30 or Biology 130. Note: Designed for students with High School Biology 30.

## 144.4 / *Chemistry*

CHEM 230. *Inorganic Chemistry.* ♦6 (3-1s-3). The fundamental concepts of Chemistry as applied to the elements and their compounds. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

CHEM 250. *Organic Chemistry.* ♦6 (3-1s-3). Introduction to a study of the compounds of carbon. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent. Note: Students with credit in Chemistry 230 will normally proceed to Chemistry 350, not 250. Students not concurrently taking Chemistry 230 are required to take the one-hour seminar.

CHEM 450. *Organic Chemistry.* ♦6 (3-3). Mechanisms and reactions of aromatic and aliphatic compounds. Prerequisites: Chemistry 230 or 232, and 250 or 350. Prerequisite or corequisite: Chemistry 370 or 372.

## 144.5 / *English*

ENGL 210. *English Language and Literature.* ♦6 (3-0). Designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

## 144.6 / *Microbiology*

MICRB 360. *General Microbiology.* ♦6 (3-3). Properties and activities of bacteria, fungi and viruses, leading to an interpretation of the mechanisms of sterilization, pathogenicity and immunity, chemotherapy and industrial processes. Laboratory exercises in basic microbiological techniques and their practical applications. Prerequisites: Chemistry 230 and Chemistry 250 or 350 (can be taken concurrently), Biology 230 or Biology 130, or consent of the Department.

## 144.7 / *Pharmacology*

PMCOL 431. *Pharmacology.* ♦4 (2-3). The pharmacological action of drugs selected for their physiological and clinical significance. Basic pharmacological principles as applied to representative drugs having their primary actions on various organ systems of the body. Classes of drugs include general and local anaesthetics; hypnotics, sedatives, and anticonvulsants; analgesics; central nervous system stimulants; autonomic and curariform drugs; histamine and antihistaminics; cardiovascular drugs; diuretics; heavy metals and their antagonists; haemostatic agents and anticoagulants.

## 144.8 / *Pharmacy*

### 144.8.1 / UNDERGRADUATE COURSES

PHARM 210. *Introductory Pharmacy.* ♦3 (3-0). Introduction to physical pharmacy; classification of pharmaceutical preparations; pharmaceutical calculations; pharmaceutical history, literature, and terminology.

PHARM 211. *Introductory Pharmacy Laboratory.* ♦3 (0-3). The practical application of the principles covered in Pharmacy 210; compounding of representative pharmaceutical preparations discussed in Pharmacy 210. Corequisite: Pharmacy 210.

PHARM 310. *Physical Pharmacy.* ♦3 (2-0). The application of physical laws to pharmaceutical systems with emphasis on their application to various dosage forms. Theoretical consideration of structure and physical properties of matter, equilibria in solution, buffered isotonic solutions, solubility, rate processes including stability of drugs in solution, complexation, micromeritics, rheology, and radiopharmaceuticals. Prerequisite or corequisite: Pharmacy 210 and 211 and Physics 100 or 200.

PHARM 311. *Physical Pharmacy Laboratory.* ♦3 (0-3). Experimental work in the application of physico-chemical principles to pharmaceutical systems with emphasis on their application to selected dosage forms. Corequisite: Pharmacy 310.

PHARM 326. *Introduction to Medicinal Chemistry.* ♦3 (First Term, 3-0). Medicinal and related substances with emphasis on their chemical properties and on correlation between structure and physiological activity. Prerequisites: Chemistry 250 and 230.

PHARM 329. *Qualitative Analysis of Organic Medicinals.* ♦3 (Second Term, 1-3). The identification of organic medicinal compounds, emphasizing the relationships of structure, functional groups, and physico-chemical properties. Prerequisites: Chemistry 250 and 230.

PHARM 410. *Dispensing Pharmacy.* ♦3 (3-0). The proper handling of modern prescriptions. Federal and provincial legislation pertaining to the control of drugs. Problems encountered in extemporaneous compounding; theoretical principles involved in formulation of selected dosage forms. Surgical supplies. Prerequisite: Pharmacy 310.

PHARM 411. *Dispensing Pharmacy Laboratory.* ♦3 (0-3). Development of professional competence in compounding and dispensing pharmaceuticals. Assignments include a study of prescription specialties and accessories. Prerequisite: Pharmacy 311.

PHARM 424. *Pharmacognosy.* ♦6 (3-0). Drugs of natural origin of importance in medicine.

PHARM 426. *Medicinal Chemistry.* ♦6 (3-0). A continuation of the study of organic medicinal substances including inorganic medicinals. Prerequisite: Pharmacy 326.

PHARM 428. *Pharmaceutical Analysis.* ♦3 (2-0). Physical and chemical methods of identification and quantitative analysis; introduction to instrumental analytical techniques. Prerequisite: Pharmacy 329.

PHARM 429. *Pharmaceutical Analysis Laboratory.* ♦3 (0-3). Analysis of pharmaceutical preparations; physical and chemical methods of analysis; practice in the use of certain analytical instruments. Prerequisite: Pharmacy 329. Corequisite: Pharmacy 428.

PHARM 440. *Advanced Pharmaceutical Analysis.* ♦3 3-0). Advanced chemical and physical methods of analysis; the application of modern instrumental methods. Prerequisites: Pharmacy 428 and 429.

PHARM 441. *Advanced Pharmaceutical Analysis Laboratory.* ♦3 (1s-3). Analytical problems; instrumental methods of analysis.

PHARM 442. *Advanced Pharmaceutics.* ♦2 (1-0). Manufacturing pharmacy; physico-chemical principles involved in bulk manufacturing and preparation of sterile products. Prerequisite: Consent of the Department.

PHARM 443. *Advanced Pharmaceutics Laboratory.* ♦3 (0-3). Experience in formulations to demonstrate the principles covered in Pharmacy 442. Corequisite: Pharmacy 442.

PHARM 444. *Pharmaceutical Therapeutics.* ♦6 (3-0). The role of drugs in the treatment of disease; medical terminology. Prerequisite: Pharmacology 431.

PHARM 446. *Hospital Pharmacy.* ♦2 (1-0). Principles of operation and management of a hospital pharmacy. Prerequisite: Consent of the Department.

PHARM 447. *Hospital Pharmacy Laboratory.* ♦4 (0-4). Practice in the operation of a hospital pharmacy, to demonstrate the principles covered in Pharmacy 446. Corequisite: Pharmacy 446.

PHARM 449. *Thesis.* ♦3 (1s-3). Preparation and presentation of a report based on an experimental problem or a literature survey.

PHARM 482. *Antimicrobial Drugs.* ♦2 (First Term, 3-0). The use and mode of action of local and systemic antimicrobial drugs. Prerequisite: Microbiology 360 or consent of the Faculty.

PHARM 483. *Antimicrobial Drugs Laboratory.* ♦2 (First Term, 0-3). Microbiological and other methods for screening and evaluating local and systemic antimicrobial drugs.

PHARM 484. *Biological Products.* ♦2 (Second Term, 3-0). Manufacture, control, licensing, and rationale of the use of biological and microbiological products (immunizing and diagnostic agents, antibiotics and other biological and microbiological products). Prerequisite: Microbiology 360 or consent of the Faculty.

PHARM 485. *Biological Products Laboratory.* ♦2 (Second Term, 0-3). Microbiological assays, biological tests and other methods for the assay, standardization and control of biological and microbiological products of pharmaceutical importance.

PHARM 492. *Pharmacy Management.* ♦3 (First Term, 3-0). Economics, business policies, banking, bankruptcy, rents, leases, public relations, insurance, and the application of Canadian business law.

PHARM 494. *Pharmacy Marketing.* ♦3 (Second Term, 3-0). The principles of purchase and sales policies, market risk, competition, advertising, merchandising, inventory control salesmanship, credit, business opportunities.

## 144.8.2 / GRADUATE COURSES

PHARM 501. *Istotope Tracer Methodology.* ♦3 (First Term, 3-3). Lectures: fundamental principles of radioactivity and health physics. The importance of radioisotopes in medicine, agriculture, industry, and research. Problems and limitations in the use of radioisotopes as tracers. Instrumentation and analysis methods. Laboratory: handling and preparation of radioisotopes for counting. Counting procedures. Tracer chemical and biochemical analyses.

PHARM 502. *Advanced Tracer Methodology.* ♦3 (Second Term, 3-3). Lectures: application of radioactive isotopes to biochemical problems in research, diagnostic medicine, agriculture and industry. Experimental procedures, application of methods of analysis, and criteria for evaluation of results. Newer applications and methods reported in the literature. Laboratory: a practical project involving the use of one of the available radioactive isotopes. Prerequisite: Pharmacy 501.

PHARM 503. *Isotopes in Nuclear Medicine.* ♦3 (Second Term, 3-0). Application of radioisotopes in medical diagnosis and treatment; control of radioisotopes in the hospital; radiation hazards. Prerequisite: Pharmacy 501 or consent of the Faculty.

PHARM 505. *Radiation Biology.* ♦3 (Second Term, 3-3). Lectures: biological effects of ionizing radiations on physiological and biochemical systems with special emphasis on recent trends and thought. Laboratory: experimental evaluation of radiation damage and radiation dosimetry. Prerequisite: Pharmacy 501 or equivalent or consent of the Department.

PHARM 510. *Advanced Physical Pharmacy.* ♦3 (First Term, 3-4). Lectures: Special topics of a physical chemical nature applicable to pharmaceutical systems, with emphasis on physical properties and molecular structure, multiple equilibria, solubility phenomena, complexation, drug decomposition and preservation. Laboratory: Experimental work in application of physico-chemical principles to pharmaceutical systems. Prerequisite: Mathematics 201 or equivalent or consent of the Department.

PHARM 511. *Pharmaceutical Formulation and Development.* ♦3 (Second Term, 3-4). Theoretical considerations basic to the technology of pharmaceutical dosage forms to meet the requirements of therapeutic efficacy, stability, and safety. Laboratory: development and formulation of pharmaceutical products. Prerequisite: Pharmacy 442 and 443 or consent of the Department.

PHARM 520. *Structure—Action Relationships of Organic Medicinals.* ♦3 (First Term, 3-0). Topics in the relationship between chemical structure and biological action of organic medicinal agents.

PHARM 521. *New Synthetic Organic Compounds with Promising Pharmacological Activities.* ♦3 (Second Term, 3-0). The synthesis, structural elucidation, results of pharmacological evaluation, structure-activity relationships, and results of clinical trials of novel synthetic organic compounds exhibiting promising pharmacological activities. Prerequisite: Consent of the Department.

PHARM 522. *Phytochemistry.* ♦3 (First Term, 3-0). The biosynthetic pathways and the chemotaxonomic relationships of alkaloids, flavonoids, steroids, terpenoids, and related secondary products of natural origin of importance in pharmacy. Prerequisite: Consent of the Department.

PHARM 523. *Medicinal Macromolecules.* ♦3 (Second Term, 3-0). The degradative and synthetic chemistry of more complex medicinal compounds. Their properties, especially physical properties, as related to their pharmaceutical use. Medicinal polysaccharides (e.g. starch, cellulose and its derivatives, acacia, heparin), medicinal polypeptides (e.g. penicillins, streptomycin, tetracyclines). Prerequisite: Consent of the Department.

PHARM 525. *Applications of Nuclear Magnetic Resonance Spectroscopy to Medicinal and Pharmaceutical Chemistry.* ♦3 (First Term, 3-0). Examples of the use of N.M.R. spectroscopy in problems of pharmaceutical analysis and synthesis and to studies of the mode of action of medicinally active compounds. Prerequisite: Consent of the Department.

PHARM 525. *Sterochemical Aspects of Medicinal and Pharmaceutical Chemistry.* ♦3 (Second Term, 3-0). The influence of molecular geometry upon the action of compounds used in medicine. Prerequisite: Consent of the Department.

PHARM 599. *Graduate Seminar.* (1s-0). Topics related to the fields of specialization of the graduate student.

## 144.9 / *Physical Education*

PHYS ED 218. *Activity Course — Men.* ♦0 (0-2). Tests in fitness and aquatics in the First Term, followed by student-selected recreational activities. Note: Course required of all first-year men.

PHYS ED 228. *Activity Course—Women.* ♦0 (0-2). Foundations of Physical Education with emphasis on fitness, followed by two electives in recreational activities. Note: Course required of all first-year women.

## 144.10 / *Physiology*

PHYSL 361. *Elementary Physiology.* ♦6 (3-3). Essentials of mammalian physiology. Laboratory experiments designed, whenever possible, to relate to the lectures. Prerequisites: Biology 130 or 230 or Zoology 220 or 225; Chemistry 250 or 350; Biochemistry 300 and Physics 200 or 340 are recommended. Note: Offered to students in Pharmacy, Arts and Science and Household Economics. Students from other faculties may register with Departmental permission. Textbook: Bell, Davidson, and Scarborough, *Textbook of Physiology and Biochemistry.*

## 144.11 / *Veterinary Science*

VET S 404. *Veterinary Science.* ♦3 (First Term, 3-0). Veterinary biologicals; general sanitary measures for control of animal and poultry diseases; review of deficiency ailments; prevalent animal diseases with reference to recent pharmaceutical preparations and biological products used in treatment and prevention; some common sporadic ailments of farm animals and their remedies.

*Chemical analysis by means of a polarimeter, which measures the rotation of light.*

*Dr. M. L. Van Vliet, Dean of the Faculty of Physical Education.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# *Faculty of Physical Education*

## 151 / INTRODUCTORY

### 151.1 / *Members of the Faculty*

#### 151.1.1 / STAFF

*Professor and Dean*
M. L. VAN VLIET, Ed.D.

*Professors*
(Miss) P. L. AUSTIN, Ph.D. (on leave, 1968-69)
M. L. HOWELL, Ed.D.
W. D. SMITH, Ed.D.

*Associate Professors*
A. F. AFFLECK, M.S.
(Miss) R. O. ANDERSON, M.Ed.
(Miss) A. M. CARSON, M.A.
C. J. DRAKE, M.S.
A. W. E. ERIKSSON, M.S.
L. J. FOURNIER, M.A.
R. B. J. MACNAB, Ph.D.
H. J. McLACHLIN, M.S.
S. MENDRYK, Ph.D.
R. H. ROUTLEDGE, M.Ed.
M. F. R. SMITH, B.Ed.

*Assistant Professors*
(Miss) P. CONGER, M.A.
(Miss) D. DARWICK, M.A.
G. ELLIOTT, B.Sc.
(Miss) M. ELLIS, Dip. P.E.
R. G. GLASSFORD, M.S. (on leave, 1968-69)
(Mrs.) D. J. HARRIS, B.A.
S. ROBBINS, Dip. P.E.
M. SINGH, Ph.D.
R. B. WILBERG, Ph.D.

*Lecturers*
(Miss) J. BOORMAN, Dip. P.E.
(Miss) A. HALL, B.A., B.P.H.E.
(Miss) J. JAMES, B.P.E.
(Mrs.) L. E. READ, B.P.E.
D. SANDE, B.P.E.

#### 151.1.2 / ADDITIONAL MEMBERS OF FACULTY COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Professor*
D. B. SCOTT, Ph.D. (Computing Science)

*Associate Professors*
R. H. KNOWLES, M.Sc. (Horticulture)
N. M. PURVIS, M.Ed. (Elementary Education)
B. R. J. SPROULE, M.D. (Medicine)

*Other Members*
R. ALDERMAN, Ph.D. (Fitness Research Unit)
A. TAYLOR, Ph.D. (Fitness Research Unit)

*Registrar*
A. D. CAIRNS, B.A.

### 151.2 / *General Information*

A School of Physical Education was organized under General Faculty Council in 1954. The degree program in Physical Education has been offered since 1950. The program originally led to the degree of Bachelor of Education in Physical Education, which has been superseded by the degree of Bachelor of Physical Education. Effective April 1, 1964 the School became the Faculty of Physical Education.

The Faculty also offers a four-year program leading to the degree of Bachelor of Arts in Recreation Administration.

In addition to these two programs, the Faculty provides instruction in teaching methods in both health and physical education for students in the Faculty of Education, conducts service classes (required) for first-year students in all faculties, organizes and supervises intramural programs and acts in an advisory capacity for the intercollegiate athletic programs.

Students holding the degree of B.P.E. or its equivalent may undertake graduate study in physical education leading to the degree of Master of Arts, Master of Science and Doctor of Philosophy. The calendar of the Faculty of Graduate Studies should be consulted.

The demand for qualified people in both the fields of physical education and recreation continues to increase each year, far exceeding the supply.

*Teacher Education.* The Faculty of Physical Education is responsible for courses in health and physical education offered to students in the Faculty of Education.

A major in physical education is offered to students in the elementary route and the

secondary route. Normally, teachers qualifying to teach physical education in the secondary schools will be expected to complete the Bachelor of Physical Education degree before enrolling in the Faculty of Education.

*The Service Program.* It is the aim of the Faculty of Physical Education to make a major contribution toward the physical, mental and social life of each student through instruction and participation in physical recreational activities.

All first-year students are required to take two hours of physical education each week. Those excepted from this regulation are: (1) students declared physically unfit by the University Health Services; (2) students over twenty-five years of age.

The program is conducted in the Physical Education Building. Individual lockers, towels and shower facilities are available for all students.

*The Intramural Program.* The Faculty of Physical Education, with the co-operation of the University Athletic Board, organizes and administers a comprehensive program of intramural sports. Primary purposes of the program are to develop recreational skills and to encourage sportsmanship and friendly relations among the students of the University through athletic competition. Individual and group competitive sports for men and women include tennis, golf, track and field, cross-country running, curling, squash, handball, water polo, basketball, hockey, volleyball, touch football, swimming, and figure skating. Facilities include gymnasia, a swimming pool, outdoor playing fields, and the University ice arena.

*Intercollegiate Athletics.* As a member of the Western Canada Intercollegiate Athletic Association, the University provides opportunities for men and women to compete in intercollegiate sports. Included in the activities for men are cross country, badminton, volleyball, basketball, hockey, wrestling, swimming, track and field, football, fencing, and curling. Women compete in badminton and track and field, and hold sports weekends with member universities.

# 152 / FACULTY REGULATIONS

## 152.1 / *Admission*

Admission requirements of the Faculty of Physical Education will be found in §§ 13.1 and 13.15 of the University Regulations section of the Calendar.

## 152.2 / *Academic Standings and Graduation*

(1) To be granted the B.P.E. degree or the B.A. degree in Recreation Administration, a student must obtain a passing mark or better in all courses in the final two years of the respective degree program, obtaining a grade-point average of at least 5.0.

(2) A student will not be allowed to write more than five supplemental examinations in full courses or the equivalent, for the purpose of obtaining passing marks, or of raising his average to the required level.

(3) A student will not be allowed to write more than two supplemental examinations in full courses or equivalent in any year. (This regulation may, in exceptional circumstances, be relaxed for first-year students).

(4) A student who repeats a year will be granted no supplemental privileges in the courses taken that year and must pass all courses in the repeated year with a grade-point average of at least 5.0 to be allowed to continue.

(5) The privilege of repeating a year will be granted to a student not more than once during his candidacy for a degree in this Faculty unless by special permission of the Dean.

## 153.1 / *The Degree of B.P.E.*

| | First Term Hours | Second Term Hours |
|---|---|---|
| *First Year* | | |
| (1) ENGL 200 or 210 (English) | 3-0 | 3-0 |
| (2) PSYCO 202 or 212 (Psychology) | 3-0 | 3-0 |
| (3) Approved Arts or Science option | 3-0 | 3-0 |
| (4) Science option | 3-3 | 3-3 |
| (5) P ED 205 (Men) Activity) or P ED 209 (Women) (Activity) | 1-2 | — |
| (6) P ED 211 (Men) (Gymnastics) or P ED 213 (Women) (Motor Performance) | — | 1-2 |
| (7) P ED 215 (Aquatics) | — | 1-2 |
| (8) P ED 243 (Introduction) | 2-0 | — |
| *Second Year* | | |
| (1), (2), and (3) Three approved Arts or Science options | 9-0 | 9-0 |
| (4) P ED 211 (Women) (Gymnastics) or | — | 1-2 |
| P ED 217 (Men) (Football) | 1-2 | — |
| (5) P ED 305 (Basketball) | 1-2 | — |
| (6) P ED 307 (Social and Folk Dance) | — | 1-2 |
| (7) P ED 345 (History) | — | 3-0 |
| (8) P ED 362 (Anatomy) | 3-0 | 3-0 |
| (9) Physical Education option | 3-0 | — |
| *Third Year* | | |
| (1) PHYSL 260 (Physiology) | 3-1 | 3-1 |
| (2) Approved Arts or Science option. Philosophy 240 or 242 is recommended for those planning to qualify for a teaching certificate | 3-0 | 3-0 |
| (3) P ED 363 (Kinesiology) | 3-0 | — |
| (4) P ED 392 (Health) | 3-0 | 3-0 |
| (5) P ED 401 (Track and Field) | 1-2 | — |
| (6) P ED 405 (Women) (Dance) or P ED 409 (Men) (Hockey and Wrestling) | — | 1-2 |
| (7) P ED 449 (Sociology of Sport) | 3-0 | — |
| (8) P ED 481 (Field Work) | 0-3 | — |
| (9) and (10) Two Physical Education options | — | 6-0 |
| (11) P ED 389 (Outdoor School) | 90 hours | |
| *Fourth Year* | | |
| (1) P ED 347 (Philosophy) | 3-0 | — |
| (2) P ED 371 (Athletic Training) | 1-2 | — |
| (3) P ED 375 (Measurement) | — | 2-1 |
| (4) P ED 403 (Individual Sports) | — | 1-2 |
| (5) P ED 413 (Elementary Physical Education) | 1-2 | — |
| (6) P ED 442 (Administration) | 3-0 | 3-0 |
| (7) P ED 451 (Recreation) | — | 3-0 |
| (8) P ED 463 (Motor Learning) | — | 3-0 |
| (9) P ED 473 (Exercise Physiology) | 3-2 | — |
| (10) P ED 483 (Field Work) | — | 0-3 |
| (11) P ED option (First Term) | 3-0 | — |
| (12) P ED option (Second Term) | — | 3-0 |

*Choice of options.* Options in the B.P.E. program are divided into two groups. A student may not select more than three courses from either group. The groups are as follows:

GROUP A: Adapted Physical Education; Biomechanics of Physical Activity; Camp Administration; Community Health; Comparative Physical Education; Growth and Development; Introduction to Research Technique; Training and Conditioning Methods; Human Performance.

GROUP B: Advanced Aquatics; Advanced Basketball; Advanced Contemporary Dance; International Folk Dance; Advanced Football; Advanced Gymnastics; Advanced Hockey; Officiating; Advanced Soccer; Advanced Track and Field.

NOTE: The final year of the previous three-year B.P.E. program will be 1968-69. Those already enrolled in this program should consult the Faculty for information.

## 153.2 / *The Degree of B.A. in Recreation Administration*

*First Year*

(1) English 200 or 210
(2) Sociology 202
(3) Psychology 202
(4) Approved Mathematics or Science option
(5) P ED 205 or P ED 209
(6) P ED 215
(7) P ED 243

*Second Year*

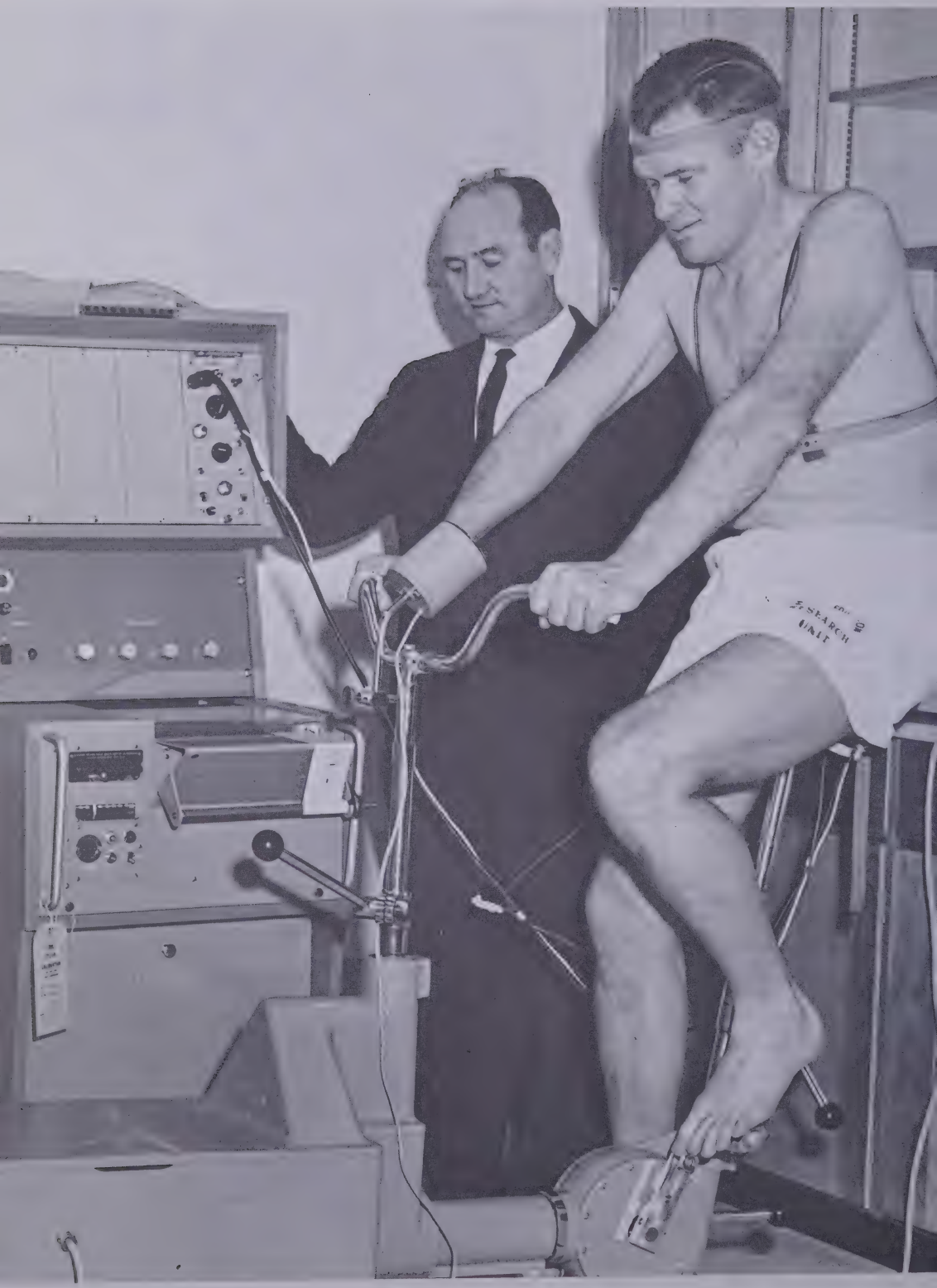
(1) Art 230 or Education C I 215
(2) Drama 252
(3) Sociology 321 and Sociology 341 or Psychology 341
(4) Approved Arts or Science option
(5) P ED 307
(6) Recreation 353 (Camp Counselling)
(7) Recreation 355 (Introduction to Community Recreation)
(8) Recreation 357 (Methods and Materials in Recreation Leadership I)
(9) Recreation 359 (Methods and Materials in Recreation Leadership II)
(10) P ED 389 (Outdoor School)

*Third Year*

(1) Drama 240
(2) Education C I 215 or Art 230
(3) Sociology 459, *or* 361 and 460 *or* Psychology 353 and 383.
(4) P ED 401—Activity Course
(5) P ED 403—Activity Course
(6) Recreation 455—Recreation Administration
(7) Recreation 457—Field Work in Public and Semi-Private Agencies
(8) An approved option

*Fourth Year*

(1) An approved Sociology or Psychology option
(2) Recreation 458 (Principles of Recreation)
(3) Recreation 459 (Planning Recreation Facilities)
(4) Recreation 465 (Community Organiaztion)
(5) and (6) Two approved Physical Education Activity options
(7) An approved option
(8) An approved option



## 153.3 / *Teacher Education*

Students interested in specializing in elementary school physical education, or who desire to include a secondary school physical education major within the Bachelor of Education program, should consult the Faculty of Education section of the Calendar, particularly § 73.2.6, ¶ (7), and § 73.3.6, ¶ (14).

## 153.4 / *Graduate Study*

The Faculty of Physical Education offers programs leading to the degrees of Master of Arts, Master of Science, and Doctor of Philosophy. Well-equipped facilities are available for a limited number of graduate students. All arrangements must be made in consultation with the Dean of the Faculty of Physical Education.

For details, students are referred to § 204.52 of the Graduate Studies section of the Calendar.

# 154 / DETAILS OF COURSES

## 154.1 / *General Information*

Courses open to students in the Faculty of Physical Education are listed here in groups, as follows: Physical Education courses in the B.P.E. program; Physical Education courses in the B.A. program; graduate courses in Physical Education; and courses offered by other faculties and schools.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Following the title of the course is the symbol "♦" standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages. An ordinary full-year course is weighted 6. A half-course is normally weighted 3. Some honors and graduate courses involving research may vary in weight according to the length and difficulty of the research project. Some courses are offered for credit only, and carry no weight.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours, respectively, required by the course in a week. Where they appear, the symbol "S" denotes seminar hours, and the symbol "L" denotes com- of instruction for a full course are the same in both terms unless otherwise indicated. If the course is a half-course, the term in which it may be offered is mentioned before the hours of instruction.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 154.2 / *Courses in the B.P.E. Program*

### 154.2.1 / REGULAR COURSES

P ED 205. *Activity Course.* ♦2 (First Term). Theory, practice, and teaching of soccer and volleyball.

P ED 209. *Activity Course.* ♦2 (First Term, 1-2). Fitness for activity. Theory, practice, and coaching of volleyball.

P ED 211. *Activity Course.* ♦2 (Second Term, 1-2). Theory, practice, and teaching of gymnastics.

P ED 213. *Introduction to Motor Performance.* ♦2 (Second Term, 1-2).

P ED 215. *Activity Course.* ♦2 (Second Term, 1-2). Theory, practice, and teaching of aquatics with emphasis on fundamental skills and stroke techniques.

P ED 217. *Activity Course.* ♦2 (First Term, 1-2). Theory, practice, and teaching of football.

P ED 243. *Introduction to Physical Education.* ♦2 (First Term, 2-0).

P ED 305. *Activity Course.* ♦2 (either term, 1-2). Theory, practice, teaching, and coaching of basketball.

P ED 307. *Activity Course.* ♦2 (either term, 1-2). Theory, practice, and teaching of folk and social dance.

P ED 345. *History of Physical Education.* ♦3 (Second Term, 3-0).

P ED 347. *Principles and Philosophy of Physical Education.* ♦3 (Second Term, 3-0).

P ED 362. *Human Anatomy.* ♦6 (3-0). Gross anatomy; the skeletal and muscular structure, the circulatory, digestive, and neural systems and their functionings in activities relating to physical education.

P ED 363. *Kinesiology.* ♦3 (First Term, 3-0).

P ED 371. *Scientific Bases of Athletic Conditioning and Training.* ♦3 (Second Term, 1-2).

P ED 375. *Tests and Measurements in Health and* Physical Education. ♦3 (First Term, 1-2). Criteria for selection of tests and the place and potential use of measurement in fields of health and physical education.

P ED 389. *Outdoor School.* Credit (80 hours).

P ED 392. *Health Education in Secondary Schools.* ♦6 (3-0).

P ED 401. *Activity Course.* ♦2 (First Term). Theory, practice, and teaching of track and field.

P ED 403. *Activity Course.* ♦2 (Second Term, 1-2). Theory, practice, and teaching of badminton, curling, skiing, and figure skating for women.

P ED 405. *Activity Course.* ♦2 (Second Term, 1-2). The study of techniques, improvisation, and composition of modern dance.

P ED 409. *Activity Course.* ♦2 (Second Term, 1-2). Theory, practice, teaching, and coaching of hockey and wrestling.

P ED 413. *Introduction to Elementary School Physical Education.* ♦2 (First Term, 1-2).

P ED 442. *Organization and Administration of Health and Physical Education.* ♦6 (3-0).

P ED 449. *Sociological Bases of Sport.* ♦3 (First Term, 3-0).

P ED 451. *Community Recreation.* ♦3 (First Term, 3-0).

P ED 463. *Human Movement and Motor Learning.* ♦3 (Second Term, 3-0).

P ED 473. *Physiology of Exercise.* ♦3 (Second Term, 3-2).

P ED 481. *Observation and Practice in Field Work.* ♦2 (0-3).

P ED 483. *Field Work Experience.* ♦2 (Second Term, 0-3). Graduation Essay.

### 154.2.2 / OPTIONAL COURSES

NOTE: The following optional courses are offered each year: Physical Education 311, 315, 335, 373, and 381. The following are offered in alternate years, and will be offered in 1969-70: Physical Education 309, 311, 317, 445, 469, and 477. The following are offered in alternate years, and will be offered in 1970-71: Physical Education 353, 407, 431, 435, 465, 467, and 491.

P ED 309. *Advanced Soccer.* ♦3 (First Term, 2-1). Prerequisite: Physical Education 205.

P ED 311. *Advanced Gymnastics.* ♦3 (either term, 2-1). Prerequisite: Physical Education 211.

P ED 315. *Advanced Aquatics.* ♦3 (either term, 2-1). Prerequisite: Physical Education 215.

P ED 317. *Advanced Football.* ♦3 (First Term, 2-1). Prerequisite: Physical Education 217.

P ED 335. *Advanced Basketball.* ♦3 (either term, 2-1). Prerequisite: Physical Education 305.

P ED 353. *Camp Administration.* ♦3 (either term, 3-0).

P ED 373. *Training and Conditioning Methods.* ♦3 (either term, 3-0).

P ED 381. *Officiating.* ♦3 (either term, 2-1) .

P ED 407. *International Folk Dance.* ♦3 (either term, 2-1).

P ED 431. *Advanced Track and Field.* ♦3 (either term, 2-1). Prerequisite: Physical Education 401.

P ED 435. *Advanced Hockey.* ♦3 (either term, 2-1). Prerequisite: Physical Education 409.

P ED 437. *Advanced Contemporary Dance.* ♦3 (either term, 2-1). Prerequisite: Physical Education 405.

P ED 445. *Comparative Physical Education.* ♦3 (either term, 3-0).

P ED 465. *Biomechanics of Physical Activity.* ♦3 (either term, 3-0). Prerequisite: Physical Education 362 and Physical Education 363.

P ED 467. *Adapted Physical Education.* ♦3 (First Term, 3-0). Prerequisite: Physical Education 362 and Physical Education 392.

P ED 469. *Growth and Development.* ♦3 (either term, 3-0).

P ED 477. *Introduction to Research.* ♦3 (either term, 3-0).

P ED 491. *Community Health.* ♦3 (either term, 3-0). Prerequisite: Physical Education 392.

PSYCO 464. *Human Performance.* ♦3 (First Term, 2-2).

## 154.3 / *Courses in the B.A. in Recreation Administration Program*

P ED 205 or P ED 209. *Activity Course.* See B.P.E. courses.

P ED 243. *Introduction to Physical Education.* See B.P.E. courses.

P ED 307. *Activity Course.* See B.P.E. courses.

REC 353. *Camp Counselling.* ♦3 (Second Term, 3-0).

REC 357. *Methods and Materials in Recreation Leadership I.* ♦3 (First Term, 1-2). Techniques in skill, instruction, conduct of clinics and public meetings, and social recreation.

REC 359. *Methods and Materials in Recreation Leadership II.* ♦3 (Second Term, 1-2).

P ED 389. *Outdoor School.* (80 hours).

P ED 401. *Activity Course* (*Men and Women*). See B.P.E. courses.

P ED 403. *Activity Course* (*Men and Women*). See B.P.E. courses.

REC 455. *Recreation Administration.* ♦3 (First Term, 3-0). Public, private, and school recreation administrative procedures relative to planning programs, facilities and sites; directing; staffing; co-ordinating; budgeting; and reporting.

REC 457. *Field Work in Public and Semi-Private Agencies.* ♦3 (Second Term, 1-3). Prerequisites: Recreation 355, Recreation 357 and Recreation 359 or consent of the Department.

REC 458. *Principles of Recreation.* ♦6 (3-0). A critical study of selected psychological, sociological, and educational theories with the view of formulating a rationale upon which recreational leadership methods and administrative decisions may be based.

REC 459. *Planning Recreation Facilities.* ♦3 (Second Term, 3-0). Prerequisites: Recreation 355 and Recreation 455 or consent of instructor.

REC 465. *Community Organization.* ♦3 (First Term, 3-0). Processes through which groups and individuals work together to mobilize resources and establish relationships.

## 154.4 / *Graduate Courses*

P ED 501. *Research.* ♦3 (First Term, 0-6).

P ED 503. *Research.* ♦3 (Second Term, 0-6).

P ED 548. *Scientific Principles of Physical Education.* ♦6 (3-0).

P ED 552. *Administrative Problems in Physical Education and Recreation.* ♦6 (3-0).

P ED 564. *Directed Studies.* ♦6 (3-0).

P ED 567. *Seminar in Human Motor Performance.* ♦3 (Second Term, 3-0). Prerequisite: Psychology 464.

P ED 569. *Physical Growth and Development.* ♦3 (either term, 3-0).

P ED 578. *Research Methods in Health, Physical Education and Recreation.* ♦6 (3-3).

P ED 588. *Historical and Comparative Physical Education.* ♦6 (3-0).

P ED 590. *History of Sports and Games.* ♦6 (3-0).

P ED 650. *Seminar in Exercise Physiology.* ♦6 (3-0).

P ED 652. *Advanced Seminar in Exercise Physiology.* ♦6 (3-0).

P ED 660. *Seminar in History of Sports and Physical Education.* ♦6 (3-0).

P ED 662. *Seminar in Comparative Physical Education and Sport.* ♦6 (3-0).

P ED 670. *Seminar in Human Motor Performance.* ♦6 (3-0).

P ED 672. *Advanced Seminar in Human Motor Performance.* ♦6 (3-0).

## 154.5 / *Courses Offered outside the Faculty*

### 154.5.1 / ART

ART 231. *Fundamentals of Visual Communication I.* ♦6 (2-4). A studio-based course concerned with the analysis of information expressed visually in two and three dimensions, and with illusion implied in line and color.

### 154.5.2 / BIOLOGY

BIOL 130. *Introductory Biology.* ♦6 (3-3). Note: Not open to students with credit in Biology 30.

BIOL 230. *Intermediate Biology.* ♦6 (3-3). Prerequisite: Biology 30 or Biology 130. Note: Designed for students with High School Biology 30.

### 154.5.3 / BUSINESS

BUS 250. *Business Principles.* ♦6 (3-0). Survey of the functional areas of business.

### 154.5.4 / DRAMA

DRAMA 250. *Voice and Speech.* ♦6 (3-0). An intensive course in voice and speech improvement with emphasis upon the oral interpretation of prose, poetry, and dramatic literature.

DRAMA 250. *Acting Technique and Production.* ♦6 (3-2). (a) Acting: Practical and theoretical through improvisation, stage performance and discussion. Emphasis is placed on the development of the actor through preparation for a role, acting scenes, and basic voice and body work. Elementary makeup. (b) Production: Practical work in technical practice.

### 154.5.5 / EDUCATION

ED CI 215. *Curriculum and Insrtuction in Elementary School Music.* ♦3 (1½L; or either term, 3-0).

### 154.5.6 / ENGLISH

ENGL 200. *A Survey of English Literature from Chaucer to the Twentieth Century.* ♦6 (3-0). A close study of representative masterpieces. Essays and tests on the prescribed literature to afford practice in setting down ideas in good English.

ENGL 210. *English Language and Literature.* ♦6 (3-0). Designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

### 154.5.7 / PHYSIOLOGY

PHYSL 260. *Elementary Human Physiology.* ♦6 (3-1). Introductory lectures on human physiology. Laboratory demonstrations designed to illustrate important aspects of human physiology using modern techniques. Note: For undergraduate students in Nursing and Physical Education.

### 154.5.8 / PSYCHOLOGY

PSYCO 202. *Introduction to General Psychology.* ♦6 (3-0). A survey of problems, methods, and principles in various fields of psychology.

PSYCO 212. *General and Development Psychology.* ♦6 (3-0). A survery of problems, methods, and principles in several fields of psychology, with particular emphasis on child, adolescent, and adult development and behavior.

PSYCO 464. *Human Performance.* ♦3 (First Term, 2-2). A comprehensive introduction to the current issues, experimentation, problems, and literature dealing with human performance. Special emphasis upon man as an information processor. Prerequisite: Psychology 202.

### 154.5.9 / SOCIOLOGY

SOC 202. *Introductory Sociology.* ♦6 (3-0). An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society analysed in terms of its structure, culture, and social ranking schemes. Interrelationships between the various institutions (e.g. family, church, school, government). The processes whereby the individual is socialized into society; the sources of conformist and non-conformist behavior. Note: Third year or more advanced students are encouraged to take Sociology 403 rather than 202.

SOC 321. *Social Problems.* ♦6 (3-0). Deviant behavior (e.g. crime, juvenile delinquency, drug addiction); and social disorganization including world population crises, urban and rural problems, industrial and other problems.

SOC 361. *Social Organization.* ♦3 (3-0). An introduction to the analysis of social systems, components, interrelations, and the bases of social differentiation and integration. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 459. *Sociology of Community Development.* ♦6 (3-0). Human communities; their institutional structure, ecological factors associated with patterns of growth, community relations, community planning and community development. Prerequisite: Sociology 202 or 403 or consent of the Department.

SOC 460. *Social Organizational Theory.* ♦3 (3-0). Models of social organization; the units of social structure; the bases of social integration, social control, and social change. Prerequisite: Sociology 202 or 403 or consent of the Department.

*Dr. J. B. Redford, Director of the School of Rehabilitation Medicine.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# School of Rehabilitation Medicine

## 161 / INTRODUCTORY

### 161.1 / *Members of the School*

#### 161.1.1 / STAFF

*Professor and Director*
J. B. REDFORD, M.D.

*Assistant Professor and Head of the Division of Occupational Therapy*
L. G. ALLBON, T.M.A.O.T., O.T.Reg.

*Assistant Professor and Head of the Division of Physical Therapy*
A. G. FAULDS, M.C.S.P., M.C.P.A., Dip. T.P.

*Assistant Professor*
(Miss) M. J. GORDON, M.C.S.P., M.C.P.A., Dip. T.P. (Physical Therapy)

*Lecturers*
(Mrs.) B. B. FIFIELD, M.A.O.T., O.T.Reg. (Occupational Therapy)
(Miss) K. R. MALCOLM, M.C.S.P., M.C.P.A., Dip. T.P. (Physical Therapy)
B. PICKLES, M.C.S.P., M.C.P.A., Dip. T.P. (Physical Therapy)
D. C. REED, M.C.
(Miss) E. F. ROWAND, O.T.Reg. (Occupational Therapy)
J. E. SEMPLE, M.C.

#### 161.1.2 / ADDITIONAL MEMBERS OF THE SCHOOL COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Dean of Medicine*
W. C. MacKENZIE, M.D.

*Associate Dean of Medicine*
D. CAMERON, M.D.

*Professors*
J. NURSALL, Ph.D. (Zoology)
M. SCHACTER, M.D. (Physiology)
K. A. YONGE, M.D., D.P.M. (Psychiatry)
H. ZIEL, Ed.D. (Vocational Education)

*Associate Professor*
G. MONCKTON, M.D. (Medicine)

*Assistant Professors*
(Mrs.) E. D. HAGEN, M.B., Ch.B. (Anatomy)
C. LARSEN, Ph.D. (Psychology)
J. ORRELL, Ph.D. (English)
J. STIRRAT, M.D. (Pathology)

*Lecturers*
P. ALLEN, M.D. (Surgery)
E. KIDD, M.D. (Medicine)

*Representatives*
(Miss) S. REICH, Association of Chartered Physiotherapists of Alberta
(Mrs.) J. RADCLIFFE, Alberta Society of Occupational Therapists

*Other Member*
(Mrs.) J. McINTYRE, Speech Therapist, University of Alberta Hospital

*Registrar of the University*
A. D. CAIRNS, B.A.

### 161.2 / *General Information*

The importance of Medical Rehabilitation was recognized by the University establishing a program in Physical Therapy in 1954. A program in Occupational Therapy was begun in 1960. Graduates aid in the recovery and re-establishment of disabled people suffering from physical and psychological disorders as members of the medical rehabilitation team.

The diploma programs comprise a three-year curriculum consisting of basic courses in Anatomy, Physiology, Biology, and Psychology as well as English, and professional courses in Medicine, Surgery, Psychiatry, and Rehabilitation procedures.

In the second year the student will be required to intern in approved institutions under the supervision of qualified Physiotherapists and Occupational Therapists. Provision is made for the payment of an honorarium by the hospital or clinic where the students intern during the summer months.

In each year of the three-year program some material will be common to all students whether they intend to practise Physical Therapy or Occupational Therapy. This material will give the student a better background in Rehabilitation in general. At the end of the first three months the student will decide which field he or she intends to pursue and will confirm his or her registration in either Physical Therapy or Occupational Therapy.

## 161.3 / *Licensing*

A graduate from this institution will be qualified to serve in Provincial and General Hospitals, Psychiatric Institutions, Clinics, Armed Services and in private practice. He or she will be eligible to register with the parent Canadian professional organizations and may expect reciprocity in England, the Commonwealth, and the international organizations in Physical Therapy and Occupational Therapy. Graduates intending to practise outside Alberta will have to comply with the local provincial or state licensing requirements regardless of their professional qualifications. They may seek further information from:

*In Canada*:

(i) The Canadian Physiotherapy Association, 64 Avenue Road, Toronto 5, Ontario.

(ii) The Canadian Association of Occupational Therapists, 57 Bloor Street West, Toronto 5, Ontario.

*In England*:

(i) The Chartered Society of Physiotherapy, Tavistock House (South), Tavistock Square, London, W.C.1.

(ii) The Association of Occupational Therapists, 251 Brompton Road, London, S.W. 3.

*In the United States*:

(i) The American Physical Therapy Association, 1790 Broadway, New York 5, N.Y. 10019.

(ii) The American Occupational Therapy Association, 251 Park Avenue South, New York, N.Y.

*Other countries*:

Information may be obtained from the Canadian Physiotherapy Association and Canadian Association of Occupational Therapists, Toronto.

## 161.4 / *Association Membership*

The Canadian Physiotherapy Association and the Canadian Association of Occupational Therapists have special post-graduate internship requirements for diploma students from all Canadian Universities, and the graduate will be required to make up these necessary hours under the direction of the professional body concerned before professional registration can be obtained.

## 161.5 / *Budget*

An estimated budget in the neighborhood of $1,800 would be required by a student who is not able to live at home. This includes room and board, books, tuition fees, student fees, travelling expenses and other incidentals.

A small charge will be made for all Occupational Therapy materials used by students.

# 162 / SCHOOL REGULATIONS

## 162.1 / *Admission*

The diploma program of the School of Rehabilitation Medicine is at present limited to sixty students per year. It is open on equal terms to applicants from Alberta and from outside the province. In all cases, preference will be given on the basis of academic standing.

The matriculation requirements of the School are set out in § 13.16.1 of the University Regulations.

## 162.2 / *Academic Standings and Graduation*

(1) Each student must obtain a grade of at least 4 in each subject and a grade-point average of at least 5.0 in each of the three years.

(2) At the end of each academic year the Council of the School reviews the record in theory and practice of each student. A student who has failed to maintain the grade-point average of 5.0 required for promotion may, depending on the circumstances, be allowed to repeat the year or be required to withdraw from the School.

(3) A supplemental examination may be granted in not more than two subjects in each year, provided the student's grade-point average is at least 5.0. The pass mark for supplemental examinations is a grade of 4.

(4) In order to proceed to the third year, a student must have met the academic requirements and also successfully completed the required number of hours of clinical training both during the university term and during summer internship.

(5) In order to graduate, a student must have met the academic requirements and also successfully completed the required number of hours of clinical training both during the university term and during summer internship.

## 162.3 / *Additional Regulations*

(1) *Medical Tests*: A medical certificate form, which is obtained from the Registrar at the same time as the application form, must be completed and signed by the applicant's family physician and must accompany the application form when it is returned to the Registrar.

(2) *Uniforms*: In their first year students will be expected to provide a short-sleeved white cotton blouse (T-shirt for male students), green shorts, white running shoes and white socks. In their second year female physiotherapy students will require two white cotton uniforms, white stockings, and a pair of white oxfords. Male physiotherapy students will require dark grey trousers, white shirt, white shoes and white socks. Students in Occupational Therapy will be advised as to their uniform requirements in their second year.

(3) *Internship*: In the second year the student will be required to intern in approved institutions under the supervision of qualified Physiotherapists and Occupational Therapists. Provision is made for the payment of an honorarium by the hospital or clinic where the students intern during the summer months.

# 163 / PROGRAMS OF STUDY

## 163.1 / *Introductory Note*

A number of courses are common to both the Occupational Therapy and Physical Therapy programs (see § 161.2, above). In the following outlines, these courses are marked with an asterisk (*).

## 163.2 / *Diploma in Occupational Therapy*

| | *Total hours of instruction* |
|---|---|
| *First Year* | |
| *ANAT 201 (Anatomy) | 221 |
| *ENGL 210 (English) | 78 |
| REHAB 205 (Occupational Therapy) | 130 |
| *P ED 226 (Physical Education) | 52 |
| *PSYCO 212 (Psychology) | 78 |
| *REHAB 210 (Rehabilitation) | 104 |
| *Second Year* | |
| REHAB 316 (Applied Anatomy) | 39 |
| REHAB 326 (Clinical Training) | 234 |
| REHAB 330 (Medicine & Surgery) | 52 |
| REHAB 305 (Occupational Therapy) | 208 |
| *PHYSL 261 (Physiology) | 156 |
| *REHAB 335 (Psychiatry) | 26 |
| SOC 403 (Sociology) | 78 |
| REHAB 328 (Summer Clinical Training) | 12 wks. |
| *Third Year* | |
| REHAB 416 (Applied Anatomy) | 26 |
| *REHAB 445 (Clinical Neuro-physiology) | 39 |
| *REHAB 450 (Clinical Therapeutics) | 52 |
| REHAB 426 (Clinical Training) | 260 |
| REHAB 405 (Occupational Therapy) | 91 |
| REHAB 406 (Occupational Therapy) | 247 |
| REHAB 435 (Psychiatry) | 52 |
| REHAB 456 (Speech Therapy) | 26 |

## 163.3 / *Diploma in Physical Therapy*

| | *Total hours of instruction* |
|---|---|
| *First Year* | |
| *ANAT 200 (Anatomy) | 221 |
| REHAB 220 (Electrotherapy) | 52 |
| *ENGL 210 (English) | 78 |
| REHAB 240 (Physical Therapy) | 130 |
| *P ED 226 (Physical Education) | 52 |
| *PSYCO 212 (Psychology) | 78 |
| *REHAB 210 (Rehabilitation) | 104 |
| *Second Year* | |
| REHAB 315 (Applied Anatomy) | 52 |
| REHAB 325 (Clinical Training) | 195 |
| REHAB 320 (Electrotherapy) | 78 |
| REHAB 331 (Medicine & Surgery) | 65 |
| *PHYSL 261 (Physiology) | 156 |
| *REHAB 335 (Psychiatry) | 26 |
| REHAB 340 (Remedial Exercises) | 260 |
| REHAB 327 (Summer Clinical Training) | 13 wks. |
| *Third Year* | |
| REHAB 415 (Applied Anatomy) | 52 |
| *REHAB 445 (Clinical Neuro-physiology) | 39 |
| *REHAB 450 (Clinical Therapeutics) | 52 |
| REHAB 425 (Clinical Training) | 390 |
| REHAB 420 (Electrotherapy) | 39 |
| REHAB 440 (Remedial Exercises) | 208 |
| REHAB 455 (Speech Therapy) | 6 |

## 163.4 / *Teacher Training Diploma in Occupational Therapy*

The Division of Occupational Therapy offers a two-year program leading to a Teacher Training Diploma in Occupational Therapy. The requirements for admission are set out in § 13.16.2 of the University Regulations section of the Calendar. The requirements for promotion and graduation are in general the same as for the undergraduate programs offered by the School. Assistantships are available to well-qualified candidates.

*First Year*: ED FDN 201 or equivalent; ED VOC 279 and 281 or equivalents; REHAB 515, 516, and 517.

*Second Year*: ED PSY 471; *one* of ED PSY 469, 475, 487, or 489; REHAB 525, 526, and 527.

# 164 / DETAILS OF COURSES

## 164.1 / *General Information*

Courses required of students in the School of Rehabilitation Medicine are listed here for each program offered by the School. Courses marked with an asterisk (*) are common to both the Occupational and Physical Therapy programs, and are described under the former.

Each course is designated by its computer abbreviation and by a number. Students should use this abbreviation and number when filling in their registration forms.

Following the title of the course is the symbol "♦" standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages. Courses not included in the computation of grade-point averages are marked "Credit".

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory or clinic hours required by the course in a week. If the hours vary between the First and Second Terms, two sets of hours are shown. If the course is a half-course, the term in which it is offered is mentioned.

## 164.2 / *Diploma in Occupational Therapy*

### 164.2.1 / FIRST YEAR

*ANAT 200. *Introductory Anatomy.* ♦8 (4-5; 3-5). Lectures and demonstrations, including dissection, covering the microscopic and gross structures of the human body, with emphasis upon the skeletal, muscular and nervous systems.

*ENGL 210. *English Language and Literature.* ♦6 (3-0). Designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.

REHAB 205. *Occupational Therapy.* ♦6 (Second Term, 3-7). An introduction to the history and development of Occupational Therapy and its role in Rehabilitation.

*P ED 226. *Physical Education.* Credit (0-2). This course will include rhythmics, active games and dancing suitable for all age groups as well as swimming and water safety techniques.

*PSYCHO 212. *General and Developmental Psychology.* ♦6 (3-0). A survey of problems, methods, and principles in several fields of psychology, with particular emphasis on child, adolescent and adult development and behavior.

*REHAB 210. *Rehabilitation.* ♦4 (First Term, 3-5). An introduction to the basic principles of Physical and Occupational Therapy. An elementary course in First Aid will be presented by a member of the St. John's Ambulance Corps.

### 164.2.2 / SECOND YEAR

REHAB 316. *Applied Anatomy.* ♦3 (0-2; 0-1). A detailed study of the nervous system and functional anatomy as related to Occupational Therapy.

REHAB 326. *Clinical Practice.* ♦none (0-9). An introduction to the practical application of Occupational Therapy techniques in various local approved institutions.

*REHAB 330. *Medicine and Surgery.* ♦6 (2-0). A series of lectures on the common diseases met with in the Rehabilitation Department including pathology, medical and surgical conditions, and orthopaedic problems.

REHAB 305. *Occupational Therapy.* ♦9 (2-6; 2-4). Lectures and further training in therapeutic activities as applied in the treatment of psychiatric illness and physical disabilities. A short course will be presented by the School of Household Economics. A series of lectures will be given in administration and the theory of Occupational Therapy.

*PHYSL 261. *Introductory Physiology.* ♦6 (3-3). The lecture course comprises the essentials of human physiology. The laboratory course provides experience in handling of living tissues and in certain basic physiological techniques. Prerequisites: Biology 30 or Biology 130 or 230; Anatomy 200.

*REHAB 335. *Introductory Psychiatry.* ♦3 (1-0). An orientation towards the understanding of personality, its development and function in health and disease. An introduction to group dynamics.

SOC 202. *Introductory Sociology.* ♦6 (3-0). An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society analysed in terms of its structure, culture, and social ranking schemes. The interrelationships between the various institutions (e.g. family, church, school, government). The processes whereby the individual is socialized into society; the sources of conformist and non-conformist behavior.

REHAB 328. *Clinical Practice.* Credit (12 weeks). A period of twelve weeks in approved hospitals and institutions for practical experience in Occupational Therapy Departments.

### 164.2.3 / THIRD YEAR

REHAB 416. *Applied Anatomy.* ♦2 (0-1). The study and evaluation of anatomical movement in relation to functional activities.

*REHAB 445. *Clinical Neuro-Physiology.* ♦6 (2-0; 1-0). An introduction and appreciation of the neuro-physiology and gross pathology of some of the common disease conditions referred to Rehabilitation Departments for treatment.

*REHAB 450. *Clinical Therapeutics.* ♦6 (2-0). The medical application of physical principles and rehabilitation techniques demonstrated clinically with patients and assisted by Hospital and Clinic staff.

REHAB 426. *Clinical Practice.* Credit (0-9; 0-11). The continuation of practical training under the supervision of qualified Occupational Therapists.

REHAB 405. *Occupational Therapy Theory.* ♦7 (3-0; 4-0). A presentation in tutorials and lectures of the purpose and function of the profession.

REHAB 406. *Therapeutic Occupation.* ♦8 (0-9; 0-10). Practical laboratory experience in Therapeutic Occupations for every type of patient. Recreational activities.

REHAB 435. *Advanced Psychiatry.* ♦4 (4-0). A discussion of factors influencing personality function—factors both detrimental and beneficial. Personality disorders, their diagnosis, classification and treatment, with special reference to the role of the Occupational Therapist.

REHAB 456. *Introductory Speech Therapy.* ♦2 (1-0; 0-1). A series of lectures and demonstrations as an introduction and orientation to Speech Therapy.

## 164.3 / *Diploma in Physical Therapy*

### 164.3.1 / FIRST YEAR

*ANAT 200. ♦8 (3-5). See description under Occupational Therapy.

REHAB 220. *Electrotherapy.* ♦3 (1-2). An introductory course which includes the basic physical principles of Electricity and Electronics with laboratory practice in simple therapeutic procedures.

*ENGL 210. ♦6 (3-0). See description under Occupational Therapy.

*P ED 226. Credit (0-2). See description under Occupational Therapy.

REHAB 240. *Physical Therapy.* ♦6 (Second Term, 2-6). Lectures and laboratory periods in the Theory of Movement, Body Mechanics, and early Re-education following injury or disease. Practical classes in the application of massage techniques.

*PSYCO 212. ♦6 (3-0). See description under Occupational Therapy.

*REHAB 210. ♦4 (First Term, 1-5). See description under Occupational Therapy.

### 164.3.2 / SECOND YEAR

REHAB 315. *Applied Anatomy.* ♦6 (0-2). Laboratory sessions and demonstrations, with prosected specimens, including a more detailed study of the Nervous System and Functional Anatomy of the upper extremities and thorax.

REHAB 320. *Electrotherapy.* ♦6 (1-2). Lectures related to the production of Low Frequency currents and their modifications, Short Wave Diathermy, Microwave, and Ultrasonics. Laboratory periods will include practice in their application and indications for their use in Physical Therapy.

REHAB 325. *Clinical Practice.* Credit (0-15). An introduction to the practical application of Physiotherapy techniques on patients with various physical diseases, in approved institutions.

REHAB 327. *Clinical Practice.* Credit (13 weeks). During the summer following completion of second year students will spend thirteen weeks as Interns in approved Physiotherapy departments.

*REHAB 331. ♦6 (2-0). See description under Occupational Therapy.

*PHYSL 261. ♦6 (3-3). See description under Occupational Therapy.

*REHAB 335. ♦3 (1-0). See description under Occupational Therapy.

REHAB 340. *Remedial Exercises.* ♦8 (6-7; 2-5). Lectures and laboratory periods on the appropriate treatment by Physical Therapy procedures applied to medical and surgical conditions.

### 164.3.3 / THIRD YEAR

REHAB 415. *Applied Anatomy.* ♦6 (0-2). Laboratory sessions and demonstrations, with prosected specimens, including Functional Anatomy of the Lower Extremities, Trunk, Head and Neck.

*REHAB 445. ♦6 (2-0; 1-0). See description under Occupational Therapy.

*REHAB 450. ♦6 (2-0). See description under Occupational Therapy.

REHAB 425. *Clinical Practice.* Credit (0-15). A continuation of practical experience in approved hospitals and clinics in the city.

REHAB 420. *Electrotherapy.* ♦4 (First Term, 1-2). Lectures and demonstrations in the production and therapeutic uses of Infra-Red and Ultraviolet Radiations. Practical classes will include discussion of the use of Electrotherapy in Medical and Surgical conditions.

REHAB 440. *Remedial Exercises.* ♦8 (4-3; 3-5). Lecture-demonstrations and practical classes in Remedial Exercise Techniques for medical and surgical conditions, from acute illness to full rehabilitation.

REHAB 455. *Speech Therapy.* ♦1 (First Term, 1-0). An introductory lecture series.

## 164.4 / *Teacher Training Diploma in Occupational Therapy*

### 164.4.1 / FIRST YEAR

ED FDN 201. ♦3 (either term, 3-0). An introduction to Education, the influences that have shaped and changed educational beliefs and philosophy: political, economic, social and religious. Education in Canada.

ED VOC 279. ♦3 (First Term, 3-0). Curriculum and instruction, general principles of teaching, specialized methods; course construction.

ED VOC 281. ♦3 (Second Term, 3-0). Instructional materials and their use; tests and evaluation. Application of teaching principles.

REHAB 515. ♦6 (3-3). Seminars on teaching methods and the preparation of a minimum of two activities to an advanced level in the laboratory. Practice laboratory undergraduate teaching.

REHAB 516. ♦4 (0-6). Seminars in the administration of a School and in Clinical Practice supervision and development. Student selection, syllabus and timetable development.

REHAB 517. ♦4 (0-6). Supervised practice teaching and methodology. Communication theory and the use of audio and visual aids in the classroom.

## 164.4.2 / SECOND YEAR

ED PSY 469. ♦3 (either term, 3-0). Human developmental theories stressing physical, mental, social, emotional and personality development.

ED PSY 471. ♦3 (either term, 3-0). Learning theories of continuity, connectionism, behaviorism and the cognitive approach. Motivation.

ED PSY 475. ♦3 (either term, 3-0). Individual differences of behavior, emotional and social adjustment towards educational processes.

ED PSY 487. ♦3 (either term, 3-0). The measurement and evaluation of educational objectives. The interpretation and use of tests, etc.

ED PSY 489. ♦3 (either term, 3-0). The construction of standardized and other tests. Recording, interpreting and reporting results.

REHAB 525. ♦6 (3-3). A continuation of Rehabilitation 515. Detailed preparation of teaching plans for full academic courses. Formulating lesson plans. Programmed learning.

REHAB 526. ♦6 (0-6). A continuation of Rehabilitation 516. The preparation and presentation of a thesis.

REHAB 527. ♦4 (0-6). A continuation of Rehabilitation 517. Testing and examination problem areas. Counselling and interviewing.

*Dr. D. M. Ross (centre), Dean of the Faculty of Science, with Dr. K. B. Newbound, Associate Dean, and R. C. Jacka, Assistant Dean.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# *Faculty of Science*

## 181 / INTRODUCTORY

### 181.1 / *Members of the Faculty*

#### 181.1.1 / OFFICERS OF THE FACULTY

*Dean*
D. M. ROSS, Sc.D.

*Associate Dean*
K. B. NEWBOUND, Ph.D.

*Assistant Dean*
R. C. JACKA, M.Sc.

#### 181.1.2 / DEPARTMENT OF BOTANY

*Professor and Head*
W. N. STEWART, Ph.D. (Paleobotany)

*Professors*
L. C. BLISS, Ph.D. (Ecology)
H. J. BRODIE, Ph.D. (Mycology)
R. G. H. CORMACK, Ph.D. (Plant Anatomy)
(Miss) L. L. KENNEDY, Ph.D. (Mycology)
J. H. WHYTE, Ph.D. (Physiology)

*Associate Professors*
E. A. COSSINS, Ph.D. (Plant Biochemistry)
G. H. LA ROI, Ph.D. (Ecology)
J. G. PACKER, B.Sc. (Taxonomy)

*Sessional Lecturers*
J. GOODWIN, M.Sc.

#### 181.1.3 / DEPARTMENT OF CHEMISTRY

*Killam Professor and Head*
H. E. GUNNING, Ph.D., F.R.S.C. (Physical Chemistry)

*Professors*
W. A. AYER, Ph.D. (Natural Products)
R. K. BROWN, Ph.D. (Organic Chemistry)
R. J. CRAWFORD, Ph.D. (Physical Organic Chemistry)
H. B. DUNFORD, Ph.D. (Physical Chemistry)
G. R. FREEMAN, Ph.D., D.Phil. (Radiation Chemistry)
W. A. G. GRAHAM, Ph.D. (Inorganic Chemistry)
W. E. HARRIS, Ph.D. (Analytical Chemistry)
P. KEBARLE, Ph.D. (Physical Chemistry)
S. MASAMUNE, Ph.D. (Natural Products)
R. U. LEMIEUX, Ph.D., F.R.S. (Organic Chemistry)
R. B. SANDIN, Ph.D. (Organic Chemistry)
W. R. THORSON, Ph.D. (Theoretical Chemistry)

*Associate Professors*
W. F. ALLEN, Ph.D. (Analytical Chemistry)
F. W. BIRSS, D.Phil. (Theoretical Chemistry)
R. G. CAVELL, Ph.D. (Inorganic Chemistry)
D. DARWISH, Ph.D. (Physical Organic Chemistry)
S. G. DAVIS, Ph.D. (Physical Chemistry)
S. FRAGA, D.Sc. (Theoretical Chemistry)
J. W. LOWN, Ph.D. (Organic Chemistry)
O. P. STRAUSZ, Ph.D. (Physical Chemistry)

*Assistant Professors*
M. J. BENNETT, Ph.D. (Physical Crystallography)
J. HOOZ, Ph.D. (Organic Chemistry)
R. B. JORDAN, Ph.D. (Inorganic Chemistry)
A. H. KALANTAR, Ph.D. (Physical Chemistry)
K. R. KOPECKY, Ph.D. (Organic Chemistry)
J. S. MARTIN, Ph.D. (Physical Chemistry)
S. G. McGEACHIN, Ph.D. (Natural Products)
G. J. D. PEDDLE, Ph.D. (Organic Chemistry)
J. A. PLAMBECK, Ph.D. (Analytical Chemistry)
D. D. TANNER, Ph.D. (Organic Chemistry)

#### 181.1.4 / DEPARTMENT OF COMPUTING SCIENCE

*Professor and Head*
D. B. SCOTT, Ph.D.

*Professors*
H. S. HEAPS, M.A.
S. M. HUNKA, Ph.D.
K. W. SMILLIE, Ph.D.

*Associate Professors*
W. S. ADAMS, M.Sc.
F. W. BIRSS, D.Phil.
S. CHARMONMAN, Ph.D.
T. R. OVERTON, Ph.D.
J. P. PENNY, Ph.D.
D. RANKIN, Ph.D.
M. RAZAVY, Ph.D.
K. V. WILSON, Ph.D.

*Assistant Professors*
D. M. HEAPS, M.A.
B. J. MAILLOUX, M.Sc.
W. J. MYERS, M.S.
R. PEDDICORD, Ph.D.
J. R. SAMPSON, Ph.D.
G. H. SYMS, Ph.D.
U. M. VON MAYDELL, M.Sc.

*Instructor*
W. B. McMINN, B.A.Sc.

#### 181.1.5 / DEPARTMENT OF GENETICS

*Professor and Head*
J. WEIJER, D.Sc.

*Professors*
L. P. V. JOHNSON, Ph.D.
J. KUSPIRA, Ph.D.
K. A. LESINS, D.Sc.
W. E. SMITH, Ph.D.
G. W. R. WALKER, Ph.D.

*Assistant Professors*
A. AHMED, Ph.D.
D. CAMERON, Ph.D.
D. NASH, Ph.D.

*Research Associate*
R. AKSELL, Doctor of Agriculture

*Associate Members*
P. BOWEN, M.D., F.R.C.P.(C).
R. RUTH, Ph.D.

## 181.1.6 / DEPARTMENT OF GEOGRAPHY

*Associate Professor and Chairman*
P. J. SMITH, Ph.D. (Urban Geography; Urban and Regional Planning)

*Professors*
K. D. HAGE, Ph.D. (Meteorology)
J. J. KLAWE, M.A. (Cartography)
A. H. LAYCOCK, Ph.D. (Water Resources; Air Photo Interpretation; Western Canada)
R. W. LONGLEY, M.A., Ed.M. (Meteorology; Climatology)
W. C. WONDERS, Ph.D. (Northern Lands; Settlement)

*Associate Professors*
J. F. BERGMANN, Ph.D. (Latin America; Historical; on leave, 1968-69)
V. B. PROUDFOOT, Ph.D. (Agricultural Geography; Rural Development; Ireland)
S. I. SMITH, Ph.D. (Africa; Applied Climatology)

*Assistant Professors*
R. B. BRYAN, Ph.D. (Soils; Resource Conservation; Polar Regions)
I. A. CAMPBELL, M.A. (Geomorphology; Climatology; Arid Lands)
R. G. IRONSIDE, Ph.D. (Population and Economic; Western Europe)
D. B. JOHNSON, M.A. (Urban Geography; Western Canada)
E. R. REINELT, Ph.D. (Meteorology)
N. M. SEIFRIED, M.A. (Economic; Manufacturing; North America)
O. F. G. SITWELL, M.A. (Underdeveloped Regions; Economic)

## 181.1.7 / DEPARTMENT OF GEOLOGY

*Professor and Head*
R. E. FOLINSBEE, Ph.D.

*Professors*
H. BAADSGAARD, Ph.D.
R. A. BURWASH, Ph.D.
H. A. K. CHARLESWORTH, Ph.D.
C. R. STELCK, Ph.D.
G. D. WILLIAMS, Ph.D.

*Associate Professors*
A. J. BROSCOE, Ph.D.
D. E. JACKSON, Ph.D.
J. F. LERBEKMO, Ph.D.
R. D. MORTON, Ph.D.

*Assistant Professors*
R. C. FOX, Ph.D.
D. G. W. SMITH, Ph.D.
J. A. WESTGATE, Ph.D.

## 181.1.8 / DEPARTMENT OF MATHEMATICS

*Professor and Head*
J. R. MCGREGOR, Ph.D. (Mathematical Statistics)

*Professors*
W. A. AL-SALAM, Ph.D. (Classical Analysis [Special Functions])
W. ISRAEL, Ph.D. (Relativity, on leave, 1968-69)
E. S. KEEPING, B.Sc., A.R.C.S., D.I.C. (Mathematical Statistics)
L. LORCH, Ph.D. (Classical Analysis)
H. F. J. LOWIG, Dr. Rer. Nat. D.Sc. (Algebraic Logic)
L. MOSER, Ph.D. (Number Theory, Graph Theory, Combinatorial Analysis) (on leave, 1968-69)
T. V. NARAYANA, Ph.D. (Mathematical Statistics)
M. N. OGUZTORELLI, Ph.D. (Control Theory)
A. SHARMA, Ph.D. (Analysis [Interpolation and Approximation])
M. WYMAN, Ph.D. (Classical Analysis [Asymptotics]; and Relativity)

*Associate Professors*
R. D. BERCOV, Ph.D. (Algebra [Group Theory])
W. J. BRUCE, Ph.D. (Pedagogics)
G. C. CREE, Ph.D. (Complex Variable)
D. R. CROSBY, Ph.D., D.Phil. (Differential Geometry; Topology)
Z. DITZIAN, Ph.D. (Theory of Transforms)
T. FOSTVEDT, M.Sc. (Analysis; Mathematics of Finance)
K. GARG, Ph.D. (Analysis [Real Function Theory])
C. S. HOO, Ph.D. (Algebraic Topology)
R. C. JACKA, M.Sc. (Analysis and Geometry)
R. L. McKINNEY, Ph.D. (Convexity and Topology) (on leave, 1968-69)
J. W. MACKI, Ph.D. (Ordinary Differential Equations)
K. L. MEHRA, Ph.D. (Mathematical Statistics; on leave, 1968-69)
A. MEIR, Ph.D. (Classical Analysis [Summability])
J. W. MOON, Ph.D. (Graph Theory and Combinatorics)
S. A. NAIMPALLY, Ph.D. (Topology)
E. PHIBBS, M.A. (Applied Mathematics)
J. R. POUNDER, Ph.D. (Applied Mathematics)
J. SANDERS, Ph.D. (Partial Differential Equations; Applied Mathematics)
R. J. TAIT, Ph.D. (Applied Mathematics)
J. S. W. WONG, Ph.D. (Ordinary Differential Equations; on leave, 1968-69)

*Assistant Professors*
H. L. ABBOTT, Ph.D. (Number Theory and Combinatorics)
(Mrs.) N. AL-SALAM, Ph.D. (Special Functions)
F. A. BARAGAR, Ph.D. (Mathematical Physics)
H. L. FREEDMAN, Ph.D. (Ordinary Differential Equations)
G. LUDWIG, Ph.D. (General Relativity)
R. M. MATHESEN, Ph.D. (Differential Equations)
J. S. MULDOWNEY, Ph.D. (Classical Analysis)
M. G. MURDESHWAR, Ph.D. (Number Theory; on leave, 1968-69)
A. H. RHEMTULLA, Ph.D. (Group Theory)
T. ROGERS, Ph.D. (Differential Equations)
S. K. SEHGAL, Ph.D. (Group Theory)
R. G. SINCLAIR, Ph.D. (Differential Equations)
J. R. TROLLOPE, Ph.D. (Relativity)
(Mrs.) Z. TROLLOPE, M.Sc. (Asymptotics)

*Professional Associate*
S. K. SEHGAL, Ph.D. (Group Theory)

*Sessional Lecturers*
L. BOWDEN, B.Sc. (Heuristics)
J. J. HUBERT, M.Sc. (Mathematical Statistics)

## 181.1.9 / DEPARTMENT OF MICROBIOLOGY

*Professor and Head*
W. E. RAZZELL, Ph.D.

*Associate Professors*
J. N. CAMPBELL, Ph.D.
D. W. S. WESTLAKE, Ph.D.
T. YAMAMOTO, Ph.D.

*Assistant Professors*
C. H. PAI, Ph.D.
M. M. PIECHOWSKI, Ph.D.

## 181.1.10 / DEPARTMENT OF PHYSICS

*Professor and Chairman*
J. T. SAMPLE, Ph.D. (Nuclear Physics)

*Associate Professor and Assistant Chairman*
E. R. KANASEWICH, Ph.D. (Geophysics)

*Killam Professor*
J. A. JACOBS, Ph.D., D.Sc., F.R.A.S., F.R.S.C. (Geophysics)

*Professors*
D. D. BETTS, Ph.D. (Theoretical Physics)
A. B. BHATIA, Ph.D. (Theoretical Physics)
W. K. DAWSON, Ph.D. (Nuclear Physics)
D. I. GOUGH, Ph.D. (Geophysics)
G. C. NEILSON, Ph.D. (Nuclear Physics)
K. B. NEWBOUND, Ph.D. (Spectroscopy)
H. SCHIFF, Ph.D. (Theoretical Physics)
Y. TAKAHASHI, D.Sc. (Theoretical Physics)
S. B. WOODS, Ph.D. (Low Temperature Solid State Physics)

*Associate Professors*
J. G. ADLER, Ph.D. (Low Temperature Solid State Physics)
G. L. CUMMING, Ph.D. (Geophysics)
J. P. FRANCK, Dr. Rer. Nat. (Low Temperature Solid State Physics)
D. G. HUGHES, Ph.D. (Low Temperature Solid State Physics)
H. R. KROUSE, Ph.D. (Mass Spectrometry)
W. C. OLSEN, Ph.D. (Nuclear)
B. V. PARANJAPE, Ph.D. (Theoretical Physics)
D. RANKIN, Ph.D. (Geophysics)
M. RAZAVY, Ph.D. (Theoretical Physics)
S. S. SHEININ, Ph.D. (Low Temperature Solid State Physics)
L. VERDINI, Ph.D. (Low Temperature Solid State Physics)
F. L. WEICHMAN, Ph.D. (Low Temperature Solid State Physics)

*Assistant Professors*
P. N. DAYKIN, Ph.D. (Theoretical Physics)
D. L. JONES, Ph.D. (Geophysics)
A. N. KAMAL, Ph.D. (Theoretical Physics)
W. J. McDONALD, Ph.D. (Nuclear)
E. H. PINNINGTON, Ph.D. (Spectroscopy)
G. ROY, Ph.D. (Nuclear)

*Laboratory Supervisor*
G. R. SMALL, M.A.

## 181.1.11 / DEPARTMENT OF PSYCHOLOGY

*Professor and Head*
T. M. NELSON, Ph.D.

*Professors*
L. VON BERTALANFFY, Ph.D.
E. HOWARTH, Ph.D.
J. R. ROYCE, Ph.D.
W. W. ROZEBOOM, Ph.D.
W. N. RUNQUIST, Ph.D.
P. SWARTZ, Ph.D.

*Visiting Professor*
K. D. DABROWSKI, M.D., PhD.

*Associate Professors*
W. A. BLANCHARD, Ph.D.
N. M. GINSBURG, Ph.D.
A. J. B. HOUGH, M.A.
P. P. REMPEL, Ph.D.
(Mrs.) B. G. RULE, Ph.D.
S. J. RULE, Ph.D.
D. SPEARMAN, Ph.D.
R. E. WALLEY, Ph.D.
T. E. WECKOWICZ, Ph.D.
K. V. WILSON, Ph.D.

*Assistant Professors*
B. M. ARVIDSON, M.A.
A. R. DOBBS, M.Sc.
D. LANDY, Ph.D.
(Mrs.) B. H. SCHAEFFER, Ph.D.
D. L. SCHAEFFER, M.A.

*Sessional Lecturer*
(Mrs.) C. LARSEN, Ph.D.

## 181.1.12 / DEPARTMENT OF ZOOLOGY

*Professor and Head*
J. R. NURSALL, Ph.D.

*Professors*
W. A. FULLER, Ph.D.
G. O. MACKIE, D.Phil.
S. K. MALHOTRA, D.Phil.
D. M. ROSS, Ph.D., D.Sc., F.R.S.C.
L. von BERTALANFFY, Ph.D.

*Associate Professors*
J. C. HOLMES, Ph.D.
V. LEWIN, Ph.D.
R. F. RUTH, Ph.D.
A. L. STEINER, D.Sc.

*Assistant Professors*
D. D. BEATTY, Ph.D.
D. A. BOAG, Ph.D.
H. F. CLIFFORD, Ph.D.
R. C. FOX, Ph.D.
J. S. HAYWARD, Ph.D.
(Mrs.) J. K. LAUBER, Ph.D.
J. L. MAHRT, Ph.D.
J. S. NELSON, Ph.D.
(Mrs.) S. E. ZALIK, Ph.D.
F. C. ZWICKEL, Ph.D.

*Sessional Lecturers*
(Mrs.) B. N. DANIEL, M.Sc.
(Mrs.) R. SCHACHTER, M.Sc.

*Honorary Research Associate*
J. D. SOPER

## 181.1.13 / ADDITIONAL MEMBERS OF THE FACULTY COUNCIL

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D.èsL.

*Professors*
G. E. BALL, Ph.D. (Entomology)
J. P. BOWLAND, Ph.D. (Animal Science)
G. FORD, Ph.D. (Mechanical Engineering)
W. D. GAINER, Ph.D. (Economics)
C. HEATH, Ph.D. (Physiology)
T. S. LEESON, M.D. (Anatomy)
(Miss) R. E. McCLURE, M.P.H. (Nursing)
L. D. NELSON, Ph.D. (Elementary Education)
M. SCHACHTER, M.D. (Physiology)
O. STARCHUK, D. Jur et Rer Pol. (Slavonic Languages)

*Associate Professors*
J. W. BILSLAND, Ph.D. (English)
R. T. COUTTS, Ph.D. (Pharmacy)
R. B. J. McNAB, Ph.D. (Physical Education)
N. B. MADSEN, Ph.D. (Biochemistry)

*A Geology student uses aerial photographs to determine the presence of deposits of sand, gravel, clay, and the like.*

*Assistant Professors*
S. E. SIGURDSON, Ph.D. (Elementary Education)

*Lecturer*
(Mrs.) C. G. STINSON, M.Sc. (Household Economics)

*Representative*
H. G. BASSETT, Ph.D., Association of Professional Engineers of Alberta

*Registrar of the University*
A. D. CAIRNS, B.A.

## 181.2 / *General Information*

The Faculty of Science is, with the Faculty of Arts, the oldest established faculty at The University of Alberta, instruction in Arts and Science having begun in 1908. It offers instruction in the physical and biological sciences, mathematics, and related fields.

The Faculty offers three main types of programs leading to the degree of B.Sc.: four-year Honors programs; four-year programs with specialization; and three-year General programs.

The four-year Honors programs are established primarily for students who seek careers in scientific research of an independent nature. They provide preparation for admission to graduate studies, to a Master of Science program or even in some cases to a Doctor of Philosophy program.

The three-year General program aims to provide general education with a scientific emphasis for students who seek careers in business, in teaching, in medicine and dentistry, etc.

The four-year programs with specialization aim to bridge the gap between the three-year programs and the honors program. They can provide the background necessary for admission to Graduate Studies in some cases, and in any event do permit the attainment of a professional status.

It should be noted that in many cases transfer from one program to another can be arranged easily to suit changing ambitions, needs, or academic qualifications of the student.

Regulations governing the honors, specialized, and general B.Sc. programs will be found in § 183.1, below, followed by descriptions of these programs arranged under subject headings in §§ 183.2 to 183.17.

In addition, the Faculty of Science participates in an inter-disciplinary program in Food Science jointly with the Faculty of Agriculture and the School of Household Economics. This program is described in § 183.18. Two-year pre-Dental and pre-Medical programs may be taken in the Faculty, as described in § 183.19.

# 182 / FACULTY REGULATIONS

## 182.1 / *Admission*

The admission requirements of the Faculty of Science will be found in §§ 13.1 and 13.17 of the University Regulations section of the Calendar.

## 182.2 / *Courses*

(1) *Selection of courses.* Students registered in the Faculty of Science must select courses from those set out in the Faculty of Arts and Faculty of Science sections of the Calendar (§§ 44 and 184). In rare instances, courses from other faculties or schools may be permitted by the Dean.

(2) *Selection of first-year courses.* A student shall restrict his first-year registration to junior courses in five different subjects. Senior courses may be taken in the first year only with the consent of the department concerned and the approval of the Dean.

(3) *Half-courses.* A number of courses are offered in one term only; two such courses are recognized as the equivalent of one full course. Where the curriculum requires a full course in a particular subject or classification, both half-courses must be chosen from that subject or classification; where the requirement is for an option, any two half-courses may be combined to meet the requirement. Half-courses are not open to first-year students.

(4) *Withdrawal from courses.* The deadlines for withdrawing from courses are as follows: from a full course, February 24; from a half-course taken in the First Term, November 15; from a half-course taken in the Second Term, March 10.

## 182.3 / *Academic Standings and Graduation*

The following regulations apply throughout the Faculty of Science:

(1) A student may be granted the privilege of repeating a year not more than once during his candidacy for a degree in the Faculty unless by special permission of the Dean.

(2) A student who is repeating a year will be granted no supplemental privileges in the courses taken that year, and must pass all courses with a grade-point average of at least 5.0 to be allowed to continue in the Faculty.

Further regulations regarding academic standing, promotion, and graduation vary from program to program within the Faculty of Science, and are therefore given in § 183, below. Regulations for Honors, specialized, and general programs will be found in § 183.1. Regulations for the inter-disciplinary program in Food Science will be found in § 183.18, and for pre-medical and pre-dental programs in § 183.20.

# 183 / PROGRAMS OF STUDY

## 183.1 / *The Degree of B.Sc. in the Honors, Specialized, and General Programs*

### 183.1.1 / HONORS PROGRAMS

Programs leading to the degree of Bachelor of Science with Honors are four years in length. They are designed to provide specialization in the chosen subject or subjects together with a longer training than that in the general program, as well as the higher standard implied by the term "honors".

*Admission.* Most departments provide a special first year for students who wish to read for honors. Permission to enter first-year honors is granted to students with high matriculation standing and with the approval of the department concerned. A request for this privilege should be made on the "Application for Admission" form or through the head of the department not later than the time of registration.

A student need not commit himself to honors in his first year, and may register in an appropriate selection of courses as required by the regulations of a four-year program or of a general program. If he obtains a sufficiently high standard in his first year and is recommended by the department concerned, he may enter honors in his second year. A student desiring to do so must apply to the Dean, through the head of the department concerned, preferably during his first year and in any case not later than the time of registration for the second year.

Consideration will also be given to applications for transfer to honors submitted by students who have completed the second, or even the third, year of another program.

*Selection of courses.* The following regulations govern honors programs:

(1) In each year, an honors student's program must be approved by the head of his Department and by the Dean.

(2) A student is not permitted to confine his studies to one discipline; during his first three years he must take at least three courses not closely related to his subject of specialization. For example, a student specializing in Natural Science must take at least three Arts courses.

(3) In the third and fourth years considerable latitude is permitted in order to meet the needs of individual students. A student may choose to concentrate closely on one subject or to widen his field of study. In the latter case he will not be required to take, over the four years, more than ten courses in the subject of concentration.

(4) German 210 or Russian 210 is permitted for credit as an approved option in any year. (See § 183.1.4, below).

*Academic standings and graduation.* The following regulations govern honors programs:

(1) Promotion from first year to second year, as well as from second to third and from third to fourth, is by recommendation of the department concerned, for which a grade-point average of at least 5.5 is required.

(2) A student who fails to attain the standard necessary for continuance in honors, must transfer to another program and must complete all its requirements. The special first-year honors programs are so designed that a student can proceed to a degree in a four-year program or in the general program without penalty.

(3) A student who is not recommended to continue in honors at the end of his third year, or who fails to complete the requirements for a degree with honors in

his fourth year, may be granted the general degree forthwith, provided that the courses he has taken and the standing attained are satisfactory. Otherwise he may be required to take one or more additional courses in a subsequent summer or winter session.

(4) A student who, for any reason, is unable to return to university for the fourth year may apply for a general degree under the same conditions as one who has failed to meet the required standards.

(5) An honors program may be interrupted only by special permission of the Council of the Faculty.

(6) Degrees with honors are awarded in two classes, First Class Honors and Honors. For First Class Honors a grade-point average of at least 7.5 is required; for Honors, of 5.5.

### 183.1.2 / SPECIALIZED PROGRAMS

Four-year programs are available providing education to a professional level and leading to the degree of B.Sc. with specialization in: Biochemistry, Chemistry, Computing Science, Entomology, Geology, Microbiology, Physics, and Psychology. The student proposing to specialize must arrange his program in consultation with the department concerned.

The following regulations apply to these programs:

(1) For graduation, the program must be completed with a grade-point average of at least 5.0 in all courses credited to the degree after the first year.

(2) A maximum of two grades of 3 may be presented, providing these are not in the major subject or in ancillary courses prerequisite to required courses.

(3) A student may not write more than two supplemental examinations for the purpose of improving his standing in a given year. A student will not be allowed to write more than seven supplemental examinations for the purpose of obtaining passing marks or raising his grade-point average to the required 5.0.

### 183.1.3 / GENERAL PROGRAMS

General programs in the Faculty of Science are designed to enable the student to obtain a diversified training in more than one branch of study within the limits of a three-year program. The basic outline of the programs is as follows:

*First Year*: English 200 or 210; three Science courses; one option; Physical Education.

*Second Year*: An Arts course; two Science courses; two options.

*Third Year*: An Arts course; two Science courses; two options.

The following regulations govern the programs:

(1) Each student must include in his program a minimum of three courses and a maximum of six in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration. In certain cases, an "area of concentration" extending over offerings of more than one department may be substituted for one of these subjects of concentration.

(2) No student may include more than seven junior courses in his program, except by special permission of the Dean.

(3) A student registering for the B.Sc. degree must choose his principal subject of concentration in the physical or biological sciences or mathematics. To obtain a B.Sc., the student must pass at least eight science courses. Not more than twelve science courses may be credited towards the degree.

(4) To obtain a B.Sc., a student must present a grade of 4 or better in a minimum of fourteen full courses, not less than grade 3 in a fifteenth course (provided this is not a course in a subject of concentration), and a grade-point average of at least 5.0 in all courses credited to the degree after the first year.

(5) A student may not write more than two supplemental examinations in any year, whether for the purpose of obtaining passing marks or of raising his grade-point average to the required 5.0.

(6) A student may not write more than five supplemental examinations in his three-year program.

(7) In exceptional circumstances, the Dean may permit a student to proceed to a degree over a longer period than three years, or to meet the requirements in a shorter time by attending Summer Session or taking extra courses during the Winter Session.

(8) A student transferring to the Faculty of Science with advanced standing will be required to complete at least five of his fifteen courses at The University of Alberta to qualify for the University's degree.

The following sections contain advice offered by the various Science departments to students selecting courses in their subjects of concentration. Further information may be obtained by consulting members of the department concerned.

### 183.1.4 / OPTIONS

The term "option", where it appears in the programs, means a course freely chosen by the student provided he has the necessary prerequisites. An "approved option" is an option approved by the department directing the program of the student concerned.

## 183.2 / *Biochemistry*

### 183.2.1 / HONORS IN BIOCHEMISTRY

*First Year*: Chemistry 230, Chemistry 250, Mathematics 201, Biology 130 or 230, English 200 or 210, Physical Education.

*Second Year*: Biochemistry 372, Chemistry 370 or 372, Physics 200 or 240, Mathematics 304, an Arts option (German 210 or Russian 210 recommended).

*Third Year*: Two senior half-courses in Biochemistry, Chemistry 312, Physiology 362, or Microbiology 402, Physics 340 or 400, an Arts option.

*Fourth Year*: Biochemistry 501, two senior half-courses in Biochemistry, Chemistry 450, two approved options. Recommended options for fourth year include: Chemistry 553, 555, 559, 572, 585, Biometrics 454, Genetics 351, Microbiology 402, and 404.

In the Honors program in Biochemistry opportunity will be given, in the choice of options, for concentration in various areas of Biochemistry.

Students are advised to have a reading knowledge of French, German, or Russian. Attendance at the departmental seminars is required in fourth year.

### 183.2.2 / SPECIALIZATION IN BIOCHEMISTRY

*First Year*: Chemistry 230; Chemistry 250; Mathematics 201 or 180; Biology 130 or 230; English 200 or 210; Physical Education.

*Second Year*: Biochemistry 300 or 372; Chemistry 370; Physics 100, 200, or 240; a Science option; an Arts option.

*Third Year*: Two senior half-courses in Biochemistry; Chemistry 312; an option in a Biological Science; an option in a Physical Science or Mathematics (students who took Physics 100 in their second year will be required to take Physics 240); an Arts option.

*Fourth Year*: Two senior half-courses in Biochemistry; three Science options; an option.

Students are urged to consult with the Department of Biochemistry regarding the selection of options throughout the course of the program.

## 183.3 / *Biology*

Students who choose biology as a subject of concentration are advised to consult the members of the Permanent Committee on the Biological Sciences most appropriate to their interests; this committee is represented in the Departments of Biochemistry, Botany, Entomology, Genetics, Microbiology, and Zoology.

## 183.4 / *Botany*

### 183.4.1 / HONORS IN BOTANY

The Honors program provides a comprehensive training and is the most desirable route for students intending to proceed to higher degrees and a research or academic career in this subject.

*First Year*: English 200 or 210; Chemistry 130 or 230; Geology 201; Biology 130 or 230; an approved option (students without matriculation Physics should take Physics 100); Physical Education. Students lacking Biology 30 are required to take Biology 130; students who have taken Biology 30 may proceed to more advanced courses with the consent of the Department.

*Second Year*: Two senior courses in Botany; Chemistry 350; Genetics 351; an Arts option.

*Third and Fourth Years*: Five senior courses in Botany, which must include Botany 400 and Botany 503; four approved options; one open option.

A minimum of eight courses in Botany must be taken in the honors program. Certain ancillary subjects are required and certain others are recommended as options. Students are normally required to take courses in the following subject areas: (1) introductory Botany; (2) Plant Anatomy; (3) Plant Physiology; (4) Plant Taxonomy; (5) Plant Ecology. Certain of the above subjects are covered by more than one of the senior courses. Some half-year courses may be combined to constitute a full-year course in the areas mentioned under (3), (4), and (5) above.

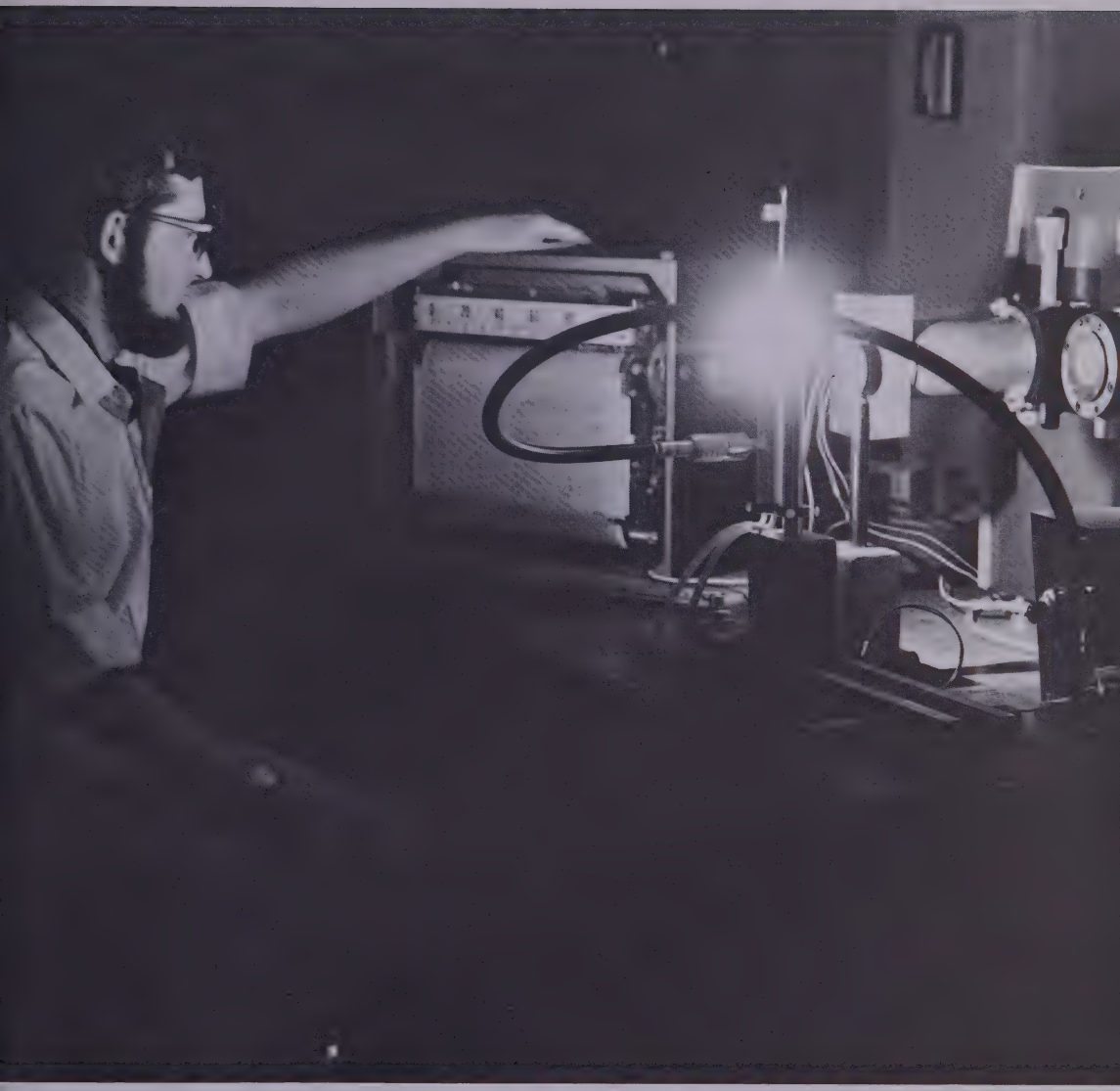
Attendance at the weekly one-hour seminar, Botany 420, is required in the third and fourth years.

Students are required to make themselves acquainted with Canadian plants by collecting and reading during the summer months.

Students intending to enter the honors program in Botany should consult the Department for advice about the details.

### 183.4.2 / CONCENTRATION IN BOTANY

Students intending to pursue Botany as far as the General program curriculum allows are advised to include in their program *five* full-year courses dealing with the fol-



*The mass spectrometer is one of the important research facilities in the Department of Physics.*

lowing subject areas: (1) introductory Botany; (2) Plant Anatomy; (3) Plant Physiology; (4) Plant Taxonomy; (5) Plant Ecology.

Certain of the above subjects are covered by more than one of the senior courses. Some half-year courses may be combined to constitute a full-year course in items (3), (4), and (5) above.

It should be noted that not every half-year course is offered in any particular year.

## 183.5 / *Chemistry*

### 183.5.1 / HONORS IN CHEMISTRY

*First Year*: Chemistry 230; Chemistry 250; Physics 240; Mathematics 201; English 200 or 210; Physical Education.

*Second Year*: Chemistry 312; Chemistry 372; Physics 340; Mathematics 304; an option. The option may be any Arts or Science course other than Chemistry or a beginning or scientific language course, unless Chemistry 250 was not taken in the first year, in which case Chemistry 350 must be taken.

*Third Year*: Chemistry 511 and 583; Chemistry 550; Chemistry 572; Mathematics 404; an option.

*Fourth Year*: Chemistry 530; Chemistry 551 and 555; Chemistry 501 and another half-course in Chemistry at the 500 level; two options.

All options must be selected in consultation with the Department. In addition to the prescribed courses, each student's program must include (1) one non-Chemistry Science course; (2) one course in scientific German or Russian (unless advanced credit has been given); (3) one Arts course, other than a beginning or scientific language; (4) one non-Chemistry option.

Special programs will be set up, following the above as closely as possible, for students transferring from other programs.

Attendance at the Departmental Research Seminar, Chemistry 602, which meets once a week, is required in the fourth year.

In addition to the regular course examinations, candidates for honors may be given one or more oral or written examinations in the field of Chemistry at the end of the fourth year.

### 183.5.2 / SPECIALIZATION IN CHEMISTRY

This program is designed to prepare a student for a vocation as a professional chemist. It may also be used for admission to graduate work in Chemistry if a satisfactory standing is obtained.

The program consists of twenty full-year courses. These must include the following:

Chemistry 230, 250 or 350, 312, 370, 430, 450 and 470.

Physics 200, or Physics 240 and 340.

Mathematics 201, or Mathematics 180 and 220.

Mathematics 304.

English 200 or 210.

Two Arts options.

Three approved options, normally chosen from Biochemistry, Biology, Chemistry, Geology, Mathematics, or Physics.

It is recommended that a language other than English be included.

To satisfy the prerequisites of the senior courses it is recommended that the Mathematics courses, the Physics courses, and the 200 and 300 courses in Chemistry be taken as soon as possible.

### 183.5.3 / CONCENTRATION IN CHEMISTRY

Students choosing Chemistry as a subject of concentration should recognize the advisability of including Mathematics and Physics as ancillary subjects in their program. The following sequences are recommended:

*Three-course sequence*: Chemistry 230, 350 and one of 312 or 370.

*Four-course sequence*: Chemistry 230, 350, 312, and 370.

*Five-course sequence*: Chemistry 230, 350, 312, 370 and one of 430 or 450.

Students seeking pre-professional and vocational training in Chemistry should consult the Department.

Students wishing to add a course in Plant Biochemistry should consult the Department of Plant Science, Faculty of Agricultuse.

## 183.6 / *Computing Science*

### 183.6.1 / HONORS IN COMPUTING SCIENCE

*First Year*: Computing Science 212; Mathematics 206 and 271; Physics 240; Arts option; Physical Education.

*Second Year*: Computing Science 312 and 313; Mathematics 306 and 326; Physics 340; Arts option.

*Third Year*: Computing Science 411, 460 and 461; one of Mathematics 421, 425, Linguistics 350, 389; Arts option.

*Fourth Year*: Two of Computing Science 550, 560, 561 and 570; two of Computing Science 540, Mathematics 421, 425, Statistics 450, 562, 564, Linguistics 350, 389, 695, 698; an option.

### 183.6.2 / SPECIALIZATION IN COMPUTING SCIENCE

*First Year*: Computing 212; Mathematics 201; Physics 240; Arts option; Physical Education.

*Second Year*: Computing 312; Mathematics 304; Mathematics 324; Physics 340; Arts option.

*Third Year*: Three of Computing 411, 460, 461, Statistics 450; Mathematics 404; Arts option.

*Fourth Year*: Two of: the one of Computing 411, 460, 461 and Statistics 450 not taken in third year, Computing 540, 500, 560, 561; one of: Mathematics 440, 500; two options.

### 183.6.3 / CONCENTRATION IN COMPUTING SCIENCE

Students planning to take Computing Science as a subject of concentration are invited to consult the Department regarding the choice of courses. The following sequence is recommended: Computing Science 212, 312, and one or more of 411, 460, and 461.

## 183.7 / *Entomology*

### 183.7.1 / HONORS IN ENTOMOLOGY

The first year program must include the university equivalent of any one of Biology 30, Chemistry 30 and Physics 30 not taken in high school, English 200 or 210, and Physical Education. Other courses required during the program include Chemistry 230 and 250 or 350, Physics 200, Zoology 300 and 350, Botany 301 and 302, Entomology 317, 318, and one or more of 471, 476, 527, 528, 556, and 560, Genetics 351, Biochemistry 300 or Plant Science 431 and 432, an approved language and two other Arts options. Recommended electives include Geology 201 and 305, Microbiology 360, Statistics 225 or Biometrics 455, and senior Botany, Genetics, and Zoology courses. Programs should be decided in consultation with the Department.

### 183.7.2 / SPECIALIZATION IN ENTOMOLOGY

The first-year program must include the university equivalent of any one of Biology 30, Chemistry 30, and Physics 30 not taken in high school, English 200 or 210, and Physical Education. Other courses required during the program include Chemistry 230 or 250 or 350, Physics 200, Zoology 300 and 350, Botany 300 or 301 and 302, Entomology 201, 317, 318 and one or more of 471, 476, 527, 528, 560, Genetics 351 and two Arts options. Recommended electives include Geology 201 and 305, Microbiology 360, Statistics 255 or Biometrics 455, Computing Science 212 or 310, and senior Botany, Genetics, and Zoology courses. Programs should be decided in consultation with the Department.

### 183.7.3 / CONCENTRATION IN ENTOMOLOGY

Students may become acquainted with the subject by taking Entomology 302 and Zoology 350; they should have high school Biology 30 or the equivalent at University before doing this. Students contemplating specialization in Entomology should consult the Department. A good background in science and especially in biology is a necessary preliminary.

## 183.8 / *Genetics*

### 183.8.1 / HONORS IN GENETICS

*First Year*: Biology 130 or 230; Chemistry 230; English 200 or 210; Mathematics 242; an approved option; Physical Education.

*Second Year*: Genetics 351; Chemistry 350; Physics 100 or 200; an approved course in biological science (Biology 230 if not taken in first year); an Arts option.

*Third and Fourth Years*: Biochemistry 300 (third year); at least three half courses in Genetics 505; two other courses in genetics; three courses in biological sciences; an Arts course; one and one-half options.

This program, during the third and fourth years, emphasizes individual study and research in conjunction with one or more members of the staff (Genetics 505). Independent work will include three aspects: assigned, untutored reading; tutored reading culminating in a carefully considered essay; and a laboratory research project with report. A comprehensive examination will weigh heavily in determining the class of degree conferred.

During his senior year an honors student may be asked to assist as a demonstrator in elementary laboratories.

A student electing the honors program should confer with the head of the Department of Genetics as early as possible in order to plan his program.

### 183.8.2 / CONCENTRATION IN GENETICS

Students planning to take Genetics as a subject of concentration are advised to consult the Department as early as pos-

sible regarding the choice of their courses. Students are advised to include Mathematics 242, Chemistry 230, Biology 230 and Genetics 351 in the first two years of their program. These provide full opportunity to enter any of the Genetics courses offered.

A general program student with a three- or four-course concentration in Genetics can undertake graduate work only by spending a year as a special student after taking a B.Sc. If an undergraduate in the general program decides to do graduate work in Genetics he should consult the Department for advice on the best combination of courses in the final years of his general program.

## 183.9 / *Geography*

### 183.9.1 / HONORS IN GEOGRAPHY

The Department of Geography offers both the B.A. and the B.Sc. degrees with Honors in Geography. Students wishing to stress the humanities and social sciences should register in the B.A. program; those who wish to stress the physical and biological sciences should register in the B.Sc. program.

*First Year*: Geography 201; English 200 or 210; Geology 201; one of Biology 130, Biology 230; one of Mathematics 200 or 201, Statistics 255, Physics 240, Chemistry 230; Physical Education.

*Second Year*: Geography 300; Geography 301; Geography 303; two approved Science options.

*Third Year*: Geography 400; one of Geography 302, 401, 405, 410, 416, or 418; one approved Arts option; Zoology 321 and Botany 321; one approved Science option.

*Fourth Year*: Geography 502; an approved second senior Geography course; one approved option in Geology; one approved Science option; one approved option.

Students are required to have a reading knowledge of French or German. At the end of the fourth year a candidate for honors will be required to take an oral or written examination in the field of Geography.

### 183.9.2 / CONCENTRATION IN GEOGRAPHY

Students interested in Geography as an area of concentration may focus on courses leading to a B.A. or B.Sc. degree. In either case, the following sequences are recommended:

*Three-course sequence*: Geography 201, 300 and one other senior Geography course.

*Four-course sequence*: Geography 201, 300 and two other senior Geography courses.

*Five-course sequence*: Geography 201, 300, 301, a regional course and one other senior Geography course.

Students interested in graduate work in Geography should consult the Department.

NOTE: Descriptions of Geography 300, 400 and other courses considered as Social Sciences will be found in the Faculty of Arts section of the Calendar.

## 183.10 / *Geology*

### 183.10.1 / HONORS IN GEOLOGY

*First Year*: Geology 201; Physics 240; Mathematics 201; English 200 or 210; one option; Physical Education.

*Second Year*: Geology 305, 306, 307, 340; Chemistry 230; Physics 340; one option.

*Third Year*: Geology 403, 405, 454, 467; two of Geology 407, 421, 440, 464; Chemistry 370; one option.

*Fourth Year*: Geology 400; four or five of Geology 407, 409, 410, 421, 440, 460, 461, 462, 465, 466, 470, 476, to make up three full courses; Physics 420; one option; a comprehensive examination.

NOTE: Two Arts courses must be included among the options.

Variations may be permitted only by the Department head and Dean.

### 183.10.2 / HONORS IN GEOLOGY AND PHYSICS

The Honors program in Geology and Physics is designed to prepare students for graduate work in either Geology or Physics, or for careers in Geophysics. By arrangement with the Departments concerned a student may select from a wide range of courses in Geology or Physics, depending on his interests.

### 183.10.3 / HONORS IN GEOLOGY AND ZOOLOGY

This program is intended to prepare students, especially those with an interest in paleontology, for either graduate work or a career in Zoology or Geology. By arrangement with the two Departments, a student may select from a range of courses depending on his interests and abilities. The following pattern is considered to represent an appropriate balancing of courses:

*First Year*: Biology 130 (for those without credit in Biology 30) or 230 (for those with credit in Biology 30); Geology 201; Mathematics 201 or Physics 200; English 210; an Arts option; Physical Education.

*Second Year*: Botany 300 or 310; Zoology 350; Geology 305, 306; Chemistry 230; an Arts option.

*Third Year*: Zoology 300; any two of Geology 340, 403, 405, 407; Genetics 351; Chemistry 350; Geology 467 or Zoology 525; one option.

*Fourth Year*: Zoology 340, 362; any two of Zoology 405, 406, 407, 408, 421; any combination of Botany 360, Geology 410 or Paleontology 518-519 to total two full courses; any two of Geology 340, 403, 405, 407; Geology 467 or Zoology 525, whichever was not taken in the previous year.

### 183.10.4 / SPECIALIZATION IN GEOLOGY

The program is designed to prepare students for a career in Geology or for graduate work in Geology provided the requirements of the Faculty of Graduate Studies can be met. The program consists of seven or more courses in Geology plus Geology 467 (Field School) including the courses listed below. A student must take at least five full courses in the Departments of Botany, Chemistry, Computing Science, Mathematics, Physics or Zoology, and a minimum of three full Arts courses.

*First Year*: Geology 201; Physics 200 or 240; Mathematics 201; English 200 or 210; Physical Education; one option.

*Second Year*: Geology 305, 306, 307, 340; Chemistry 230; two options.

*Third and Fourth Years*: Geology 400, 454, 467; eight options.

### 183.10.5 / CONCENTRATION IN GEOLOGY

Students interested in Geology may take the equivalent of one to five full courses in this subject. The sequence of courses to be taken must be approved by the departmental undergraduate adviser. A three-year B.Sc. degree with a five-course concentration in Geology can serve as preparation for either graduate work in Geology or a geological career in industry if followed, in the latter case, by a fourth year of course-work in Geology. A student enrolled in the three-year program may switch to either the four-year Honors Geology program or the four-year program with specialization in Geology after the first year, or, in most cases, after the second year.

## 183.11 / *Mathematics*

### 183.11.1 / HONORS IN MATHEMATICS

*First Year*: Mathematics 206 and 271; Physics 240, one Arts option; one option; Physical Education.

*Second Year*: Mathematics 306; two Mathematics or Statistics options; one Science option; one Arts option.

*Third Year*: Mathematics 440; Mathematics 410 or 425 or 426; Mathematics or Statistics option; two options.

*Fourth Year*: Two Mathematics or Statistics options; three options.

NOTE: The four-year program must include Mathematics 410, 425 and 426, three Arts options, and at least one of Mathematics 309 or 421, or Statistics 256 or 455, or Computing Science 310 or 460. Thus a full honors program consists of at least ten Mathematics courses.

The Arts options may include beginners' language courses such as German 210 or Russian 210.

Each honors student's program must be approved by the Honors Advisory Committee of the Department.

### 183.11.2 / HONORS IN APPLIED MATHEMATICS

The B.Sc. degree with Honors in Applied Mathematics may be taken by students who wish to specialize in mechanics, including hydrodynamics, aerodynamics, elasticity and the theory of relativity.

*First Year*: As for the program in Honors Mathematics (§ 183.11.1, above).

*Second Year*: Mathematics 306 and 309; Science option; Physics option; Arts option.

*Third Year*: Mathematics 421, 426 and 440; two options.

*Fourth Year*: Mathematics 522; Mathematics 554 or 555; Mathematics 550 or 580, or Physics 480 or 510 or 570; two options.

NOTE: The four-year program must include Mathematics 430 and three Arts options. The Arts options may include beginners' language courses such as German 210 and Russian 210.

Each honors student's program must be approved by the Honors Advisory Committee of the Department.

### 183.11.3 / HONORS IN MATHEMATICAL STATISTICS

*First Year*: Mathematics 206 and 271; Physics 240; one Arts option; one option; Physical Education.

*Second Year*: Mathematics 306; two Mathematics or Statistics options; one Science option; one option.

*Third Year*: Mathematics 440; Mathematics 325 or 410 or 426; Mathematics or Statistics option; two options.

*Fourth Year*: Two Mathematics or Statistics options; three options.

NOTE: The four-year program must include Mathematics 325, 410, and 426, Statistics 455 and Statistics 560 or 562 or 564 or 565 or 570, and three Arts options.

Each honors student's program must be approved by the Honors Advisory Committee of the Department.

### 183.11.4 / CONCENTRATION IN MATHEMATICS

Students planning to take Mathematics as a subject of concentration are advised to consult the Department as early as possible regarding the choice of their courses. Fundamental courses are Mathematics 201 or 207, Mathematics 270 or 274, and Mathematics 304. For students wishing to proceed to graduate work in Mathematics, the sequence Mathematics 201, 304, and 404 is essential. Students wishing to enter the teaching profession are advised to include Mathematics 207, Statistics 255, Mathematics 274 and 374.

A general program student may take Mathematics 206 in lieu of 201 or 207 in first year provided he has the permission of the Department. If a student passes Mathematics 206 he may apply to the Department for admission to second-year Honors. A student with a good record in Mathematics 201 or 207 may also apply to the Department for admission on the understanding that this record will be considered equivalent to Mathematics 206. If such a student is granted admission he must satisfy all the requirements of the honors program he has chosen.

## 183.12 / *Meteorology*

### 183.12.1 / CONCENTRATION IN METEOROLOGY

The Department of Geography offers instruction in meteorology and climatology. Climatology courses are listed under "Geography" in § 184, below.

Students interested in meteorology as a subject of concentration should elect the undergraduate courses offered, and acquire a good background in Physics and Mathematics. Supplementary studies in the earth sciences, Statistics, and related fields are also recommended.

## 183.13 / *Microbiology*

### 183.13.1 / HONORS IN MICROBIOLOGY

*First Year*: Biology 130 or 230, Chemistry 230, Mathematics 201, Physics 200, English 200 or 210, Physical Education.

*Second Year*: Microbiology 360; Chemistry 350; Plant Science 455 or a recommended option; a language course (German 210 or Russian 210 or French 200 recommended); an option.

*Third Year*: Microbiology 401, Chemistry 370, Biochemistry 300, Genetics 351, an Arts option.

*Fourth year*: Microbiology 402, Genetics 530, Microbiology 503, an Arts option, an option. During the fourth year each candidate for the honors degree will be required to pursue a course of directed study under the supervision of a faculty member. This will consist of an investigation of a selected problem, which will, if possible, be related to the special interests of the student and will involve the reading of current literature and some experimental work on the part of the student. The student will be required to submit a written report of the investigation for approval by the supervising faculty member and to make a brief oral presentation of his findings to staff and students of the Department.

### 183.13.2 / SPECIALIZATION IN MICROBIOLOGY

The four-year program with specialization in Microbiology is designed to provide students with the conceptual and laboratory background essential for direct employment at the B.Sc. level in industrial, government, and university laboratories.

*First Year*: Biology 130 or 230; Chemistry 230; Chemistry 250; Mathematics 201 or 180; English 210; Physical Education.

*Second Year*: Microbiology 360; Biochemistry 300 or equivalent; Genetics 351; Chemistry 312; Arts option.

*Third Year*: Microbiology 401; Microbiology 402; Chemistry 370; Arts option; approved option.

*Fourth Year*: Microbiology 403; Microbiology 404; Microbiology 515; approved option; two credits as indicated in one of the following series:

(i) Biochemistry 531; Chemistry 450, Genetics 545.

(ii) Plant Pathology 480; Biometrics 455.

(iii) Soils 430; Food Science 465; Food Science 466; Food Science 474.

### 183.13.3 / CONCENTRATION IN MICROBIOLOGY

Students considering Microbiology as a possible subject of concentration are advised that Microbiology 360 serves as an introduction to courses in Microbiology given in this and other Departments. Chemistry 250 should be taken in the first year, so that Biochemistry 300 and Microbiology 360 may be taken in the second year.

## 183.14 / *Physics*

### 183.14.1 / HONORS IN PHYSICS

*First Year*: Physics 240, Mathematics 206, Mathematics 271, English 200 or 210, approved option, Physical Education. First-year Engineering or the first year in the general program may be accepted in consultation with the Department.

*Second Year*: Physics 311, Physics 343, Physics 371, Physics 381, Physics 351, Physics 390, Mathematics 306 and 326, Arts option (Russian 210 or German 210 recommended, but any other may be substituted).

*Third Year*: Physics 474, Physics 480, Physics 440 or approved option, Mathematics 320, Mathematics 430 or an equivalent course, Mathematics 421.

*Fourth Year*: Physics 510, Physics 570, Physics 568 laboratory; three of Mathematics 426, Physics 516, Physics 520, Physics 560, Physics 572, Physics 550. Other options in the fourth year can be arranged in special cases. Students are also expected to take part in the weekly Physics Colloquium.

### 183.14.2 / HONORS IN APPLIED PHYSICS

This program is meant to prepare students for careers in industrial research and development or for graduate work in experimental physics or certain fields of engineering. The program features courses in Engineering and in Applied Physics not ordinarily available to Honors Physics students and is designed so that it may be entered at the beginning of the third year by students who have completed two years of honors physics, pass physics or engineering provided they have obtained a grade-point average of at least 5.5.

*First and Second Years*: As for the program in Honors Physics (§ 183.14.1, above).

*Third Year*: Physics 440, 468 and 474; Mathematics 404 and 430; Computing Science 310; Physics 350 or Chemical Engineering 267; Economics 303.

*Fourth Year*: A certain degree of flexibility is allowed in the choice of courses for the fourth year. Indicated here for convenience are sample programs which emphasize either nuclear or solid state physics. Other choices may be arranged in consultation with the Physics Department. *Nuclear Physics*: Physics 572, 576, 480, 510 and 568; Electrical Engineering 461. *Solid State Physics*: Physics 572, 480, 510, 516 and 568; Mining Engineering 361. A student who has not yet completed the general Honors requirements of the Faculty of Science must take an approved Arts option in place of one of the courses listed.

### 183.14.3 / HONORS IN PHYSICS (GEOPHYSICS PATTERN)

This program is designed to prepare students for careers or graduate work in Geophysics. Students with a greater interest in Geology are referred to the program in Honors Geology and Physics.

*First Year*: Physics 240, Mathematics 206, Mathematics 271, English 200 or 210, Physical Education. Approved option (Geology 201 recommended).

*Second Year*: Same as Honors in Physics.

*Third Year*: Physics 311, Physics 480, Mathematics 320, Mathematics 421, Arts option, *one* of Geology 307 and 402, Chemistry 370, Meteorology 405, Physics 440, or a senior Geology course.

*Fourth Year*: Physics 416, Physics 520, 528, Mathematics 426 or 500 and *one* of the following: Chemistry 370, 350, 430, 450, Meteorology 405, 505, Physics 440, a senior Geology course.

### 183.14.4 / HONORS IN PHYSICS AND GEOLOGY

See "Honors in Geology and Physics", § 183.10.2, above.

### 183.14.5 / SPECIALIZATION IN PHYSICS

*First Year*: Physics 240; Mathematics 206 or 201; English 200/210; two options (Mathematics 271 recommended); Physical Education.

*Second Year*: Physics 340; Physics 343; Physics 351; Mathematics 306 or 304; one option (Computing Science 320 recommended); one Arts option.

*Third Year*: Physics 311; Physics 371; Physics 390; Physics 493; Mathematics 320; Mathematics 404; one Arts option; one option.

*Fourth Year*: Physics 461; Physics 471; Physics 480; Physics 490; Mathematics (half-course in Complex Variables, to be arranged), two options.

### 183.14.6 / CONCENTRATION IN PHYSICS

(1) The Department of Physics offers three alternative junior courses, which differ in prerequisites, detailed content, and intended sequel.

*Physics 100* is a general survey intended for students who lack credit in Grade XII Physics.

*Physics 200* is a terminal course covering the general field, with Grade XII Physics as a prerequisite. It may also be used as the prerequisite for Physics 400 or Astronomy 410 for students who wish to pursue modern topics somewhat further, provided that Mathematics 201 is taken collaterally.

*Physics 240* is intended as the first course of a sequence. It is incomplete unless followed by Physics 340, for these two courses cover the general field in a two-year sequence, which can then be followed by more specialized courses in the third year. Physics 30 or Physics 100 and Mathematics 30 and 31 are prerequisite; Mathematics 201 is corequisite.

Credit cannot be given towards a degree for both Physics 100 and 200, or for more than one of Physics 200 and 240.

(2) For students taking more than one physics course in the general program, the following sequences are recommended:

*Two-course sequence*: Physics 200 and 400; or Physics 240 and 340.

*Three-course sequence*: Physics 240, 340 and 400.

*Four- or five-course sequence*: Physics 240 and 340; two or three of Physics 400, 405, 420, 440 or Astronomy 410. Mathematics 304 is advisable in the second year.

## 183.15 / *Physiology*

### 183.15.1 / HONORS IN PHYSIOLOGY

The program leading to the degree of B.Sc. with Honors in Physiology is offered by the Department of Physiology in the Faculty of Medicine.

The honors program is designed primarily to prepare students for advanced study leading to academic and research careers. A choice of courses is available for students with interests in particular branches of biology. The current trend is towards quantitative aspects of Physiology and the student is advised to acquire the best background in mathematics, and in the chemical and physical sciences, consistent with his interests and abilities.

A sample program is indicated below. Students considering Honors in Physiology should consult the head of the Department.

*First Year*: Biology 230; Chemistry 230; Mathematics 201, 206, or 180 (with Mathematics 101 if needed); Physics 200, 240 or 100; English 210 or 200; Physical Education.

*Second Year*: Biology 320; Chemistry 350; Physiology 361; German 210 or Russian 210 or an Arts option; one of the following: Chemistry 370, Mathematics 304 or 306, Physics 340 or 380, or Mathematics 308 with Physics 350.

*Third Year*: Biochemistry 300; other courses by arrangement with the Department.

*Fourth Year*: By arrangement with the Department.

## 183.16 / *Psychology*

### 183.16.1 / HONORS IN PSYCHOLOGY

The Department of Psychology offers both the B.A. and B.Sc. degrees with Honors in Psychology. Students wishing to emphasize the humanities and social sciences in their program should register for the B.A. Those who wish to emphasize the physical and biological sciences should register for the B.Sc.

Honors in Psychology will require six to ten courses in Psychology including the following: Psychology 202, 309; one Science course with laboratory; one Arts course; and an Honors Seminar 301, 401, or 501. An Honors Seminar must be taken each year with the exception of the first. A minimum of five courses will be taken in related subjects. The courses in related subjects may be all in one field (e.g. Mathematics or Biology) or in several, depending on the student's special interest and the courses' relevance to Psychology.

In addition a minimum of five optional courses will be chosen; some of these will be integrated with the program in Psychology while others must be general options.

An important feature of the Honors program is the opportunity provided for the student to engage in independent study and research. During the fourth year the student will write an honors thesis under the guidance of a member of the Department.

In addition to the regular Honors Seminar, all fourth-year honors students will be required to register in Psychology 600.

### 183.16.2 / SPECIALIZATION IN PSYCHOLOGY

This program must include English 200 or 210 and at least ten courses drawn from the Faculty of Science. The Department will require a minimum of five full courses in Psychology and a maximum of eight, in accordance with recommended sequences.

### 183.16.3 / CONCENTRATION IN PSYCHOLOGY

The Department of Psychology offers courses leading to both B.A. and B.Sc. degrees. Students wishing to emphasize the humanities and social sciences in their programs should register for the B.A. and follow one of the sequences suggested in the Faculty of Arts section of the Calendar. Students wishing to emphasize the biological sciences should register for the B.Sc. and follow one of the following sequences:

*Three-course sequence*: Psychology 202 and 309, Psychology 365 or 366 (half-courses), and one other senior Psychology course listed in the Faculty of Arts calendar.

*Four- and five-course sequence*: Psychology 202, Psychology 309, Psychology 365 and 366 (half-courses); one senior Psychology course listed as an Arts course; the remainder from senior Psychology listings in either Arts or Science.

NOTE: Since Psychology 309 is prerequisite or corequisite for Psychology 365 and 366 it should be taken in the second year.

## 183.17 / *Zoology*

### 183.17.1 / HONORS IN ZOOLOGY

The Honors program in Zoology provides a comprehensive training leading to higher degrees and a research or academic career. The program is undertaken with the advice and under the supervision of the Honors Committee of the Department. Interested students should inquire at the office of the Department of Zoology for information about the program.

*First Year*: Biology 130 or 230; Chemistry 230; Physics 100 or 200; English 210; Arts option (modern language recommended); Physical Education.

*Second Year*: Zoology 300; Zoology 350; Zoology 340; Zoology 362; Chemistry 350; Arts option.

*Third and Fourth Years*: Genetics 351; Arts option; three approved options; five full courses in Zoology or Biology, which will normally include Zoology 411, 441 and 481, and one from each of the following groups:

(i) Zoology 464, 465, 471
(ii) Zoology 405, 406, 407, 408
(iii) Zoology 451, 452, 453, 455

In addition students are required to take the zoology field course (Zoology 525) in the third and fourth years, to attend the zoology seminar (Zoology 520) in the fourth year, and to take a comprehensive oral examination on animal biology and biological principles at the end of the fourth year.

Programs are designed to be comprehensive; they may be modified to fit individual requirements at the discretion of the department. Most programs will include as approved options courses in ancillary subjects such as Biochemistry, Botany, Entomology, Genetics, Geology, and Microbiology. Courses in Statistics (Biometrics) and Computing Science will also be important to many students.

An effort is made to employ honors students in biological research during the summers.

### 183.17.2 / HONORS IN ZOOLOGY AND GEOLOGY

See "Honors in Geology and Zoology", § 183.10.3, above.

### 183.17.3 / CONCENTRATION IN ZOOLOGY

Students intending Zoology as a subject of concentration should take Biology 30 and Chemistry 30 for matriculation.

Students lacking Biology 30 must register in Biology 130 in University. Students who have completed Biology 30 will take Biology 230 in University. In first year, Chemistry 230 and Physics 100 or 200 should be taken.

A general program student usually can proceed to graduate work in Zoology only by spending a year as a special student after taking the B.Sc. If an undergraduate in the general program forms a desire to do graduate work in Zoology, he should consult the head of the Department for advice on the best combination of courses in the final years of his undergraduate program.

## 183.18 / *Inter-Disciplinary B.Sc. Program in Food Science*

A four-year inter-disciplinary program in Food Science is offered co-operatively by the Faculty of Agriculture, the School of Household Economics, and the Faculty of Science. It allows students to specialize in this expanding field more than is possible in the third- and fourth-year specialized program in Food Science offered by the Faculty of Agriculture, or the Foods and Nutrition

program offered by the School of Household Economics.

The program is administered by a committee consisting of the Deans of the Faculties of Science and Agriculture (or their representatives), the Director and a faculty member of the School of Household Economics, and the head of the Department of Food Science, who acts as the co-ordinator of the program. Students in the program are, for administrative purposes, registered in the Faculty of Agriculture.

The outline of the program is as follows:

*First Year*: Biology 130 (for those lacking Biology 30) or an approved option; Chemistry 230 and 250; English 210; Food Science 200 (attendance, but not examination, required); Mathematics 180 or 201 (or 100 for those lacking Mathematics 30); Physical Education 218 or 228.

*Second Year*: Biochemistry 300; Chemical Engineering 224; Food Science 250; Mathematics 180 or 201 or an approved option; Microbiology 360; Physics 100 or 200.

*Third Year*: Chemistry 312 and 370; Food Science 451, 465, 466, 475; an approved option.

*Fourth Year*: Agricultural Engineering 406; Food Science 452, 474, 480, 481, 561; Household Economics 458; an approved option.

The following points should be noted:

(1) *Admission.* The program is designed so that students may register in it immediately on entering University or may transfer from the Faculties of Agriculture or Science or the School of Household Economics after their first or possibly after their second year. The matriculation requirements for those entering the program from high school are set out in § 13.2.2 of the University Regulations section of the Calendar.

(2) *Promotion.* Promotion from year to year will be decided by the Inter-Disciplinary Committee, but in general the requirements for promotion will be similar to those of the Faculty of Agriculture.

(3) *Graduation.* The Inter-Disciplinary Committee will serve as a revisions committee, but the actual approval of a candidate for the degree will be by the council of the faculty or school in which he has taken the predominant part of his work.

(4) *Scholarships.* Details of scholarships for which students in the program are eligible are listed under the Faculty of Agriculture in the Awards section of the Calendar.

All inquiries should be directed to the Dean of the Faculty of Agriculture or the head of the Department of Food Science.

## 183.19 / *The B.Sc. after a Previous Degree*

*Requirements for B.Sc. after B.Ed.* Holders of the B.Ed. degree, whose programs include thirteen Arts and Science courses, may qualify for the B.Sc. degree by completing a six-course program and attaining a grade-point average of 5.0 in these courses, as prescribed by the Faculty of Science. Those with fewer than thirteen Arts and Science courses will be required to take additional courses.

*Requirements for B.Sc. after B.A.* Students who have qualified for the degree of B.A. may proceed to the degree of B.Sc. by completing a nine-course program as prescribed by the Faculty of Science and attaining a grade-point average of 5.0 in these courses.

## 183.20 / *Pre-Professional Programs for Medicine and Dentistry*

Admission to the Faculties of Medicine and Dentistry is contingent upon the successful completion of two years of university study and the presentation of full university courses in Organic Chemistry, Inorganic Chemistry, Physics, and Zoology. A student planning to enter one of these Faculties may register in a B.Sc. program in the Faculty of Science. To meet these requirements, he should include in his program Chemistry 230 and 250, Physics 100 or 200 or 240, and Biology 230 or the equivalent. If Physics 240 is taken, it should be followed by Physics 340. After successful completion of two years in the Faculty of Science, the student may apply for admission to the Faculty of Medicine or Dentistry.

## 184.1 / *General Information*

Courses open to students in the Faculty of Science are listed here in alphabetical order, whether they are offered by the Faculty of Science or by another faculty.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Courses numbered 100 to 199 are introductory, usually equivalent to high school courses. Those numbered 200 to 299 are junior courses, normally taken by first-year undergraduates. Those numbered 300 to 499 are senior courses, normally taken after the first year. Courses numbered 500 and up are normally restricted to honors and graduate students.

Following the title of the course is the symbol "♦" standing for "course weight", and a number indicating the weight of the course as used in computing grade-point averages. A normal full-year course is weighted 6. A half-course is weighted 3. Some honors and graduate courses involving research may vary in weight according to the length and difficulty of the project. Some courses are offered for credit only, and carry a weight of 0.

The next two figures, enclosed in parentheses, indicate the number of lecture hours and laboratory hours required by the course in a week. Sometimes seminar hours are also shown, indicated by an "s" after the figure. The expression "3/2" means three hours of instruction every second week. If the course is a half-course, the term in which it is offered is mentioned.

The appearance of a course description in the following list does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 184.2 / *Anthropology*

ANTHR 390. *Physical Anthropology.* ♦6 (3-3). Human evolution, anthropometric and osteological variations of man. Prerequisite: Anthropology 202, or a course in Biology or Zoology, or consent of the Department. Note: This course is accepted as a Science course in B.A. programs.

## 184.3 / *Astronomy*

Department of Physics

ASTRO 253. *Astronomy.* ♦6 (3-0). Naked-eye astronomy, astronomical co-ordinates, telescopes, sidereal and solar time, the earth-moon system, eclipses, the solar system, physics of the Sun, stellar magnitudes and spectra, variable stars, binary stars and clusters, our galaxy, exterior galaxies and quasars, cosmology. Prerequisite: Mathematics 30. Some knowledge of trigonometry and logarithms is required, and students are advised to have credit in Mathematics 31 or equivalent.

ASTRO 410. *Astrophysics.* ♦6 (3-0). Stellar spectra and their interpretation, deduction of the characteristics and constitution of stars, cosmological theories, spectroscopy of the planets and theories of the solar system, terrestrial magnetism, structure of the earth, radio-astronomy and other modern advances. Prerequisite: Physics 240 and Mathematics 201 or 207.

## 184.4 / *Biochemistry*

Department of Biochemistry, Faculty of Medicine

BIOCH 300. *General Course.* ♦6 (3-3). Structure and chemistry of the cell; the chemistry and metabolism of carbohydrates, lipids, proteins and nucleic acids; the molecular biology of enzymes and genes as related to the functioning of the living cell. Prerequisites: Chemistry 230 and 250.

BIOCH 372. *Topics in Biochemistry.* ♦6 (3-1s-3). The topics of Biochemistry 300 discussed in a more rigorous manner. Seminars on current research in Biochemistry and Molecular Biology. Prerequisites: Chemistry 230 and 250. Chemistry 370 or 372 and Mathematics 201 desirable as prerequisites or corequisites. Note: Designed for graduate students, honors students, and selected students from all departments.

BIOCH 501. *Advanced Laboratory.* ♦6 (0-6). A laboratory course to accompany the graduate lecture courses offered to fourth year Honors and to graduate students. Emphasis on standard methods and techniques as applied to biochemical research. Note: Available to fourth-year Honors Biochemistry students only.

BIOCH 511. *Enzymology.* ♦3 (First Term, 3-0). The properties of enzymes and cofactors; the chemistry, mechanisms and kinetics of selected enzymic reactions. Prerequisites: Biochemistry 300 or 372 or equivalent. Chemistry 370 or 372.

BIOCH 512. *Metabolic and Cellular Control Mechanisms.* ♦3 (Second Term, 3-0). Regulations of multienzyme systems, feedback controls and allosteric enzymes. Computer simulations. Hormonal controls. Regulation of DNA and RNA biosynthesis. Genetic control of protein biosynthesis and metabolic pathways. Prerequisites: Biochemistry 300 or 372 or equivalent. Chemistry 370 or 372. Biochemistry 511 is a recommended prerequisite.

BIOCH 521. *Nucleic Acids.* ♦3 (Second Term, 3-0). The nucleic acids from the points of view of chemistry, structure, biosynthesis and function. Prerequisites: Biochemistry 300 or 372 or equivalent. Biochemistry 531 is a recommended prerequisite.

BIOCH 531. *Chemistry of Proteins.* ♦3 (First Term, 3-0). A lecture course on topics in protein chemistry, including: isolation and solubility; electrochemical properties; size, shape and hydration; methods for establishment of primary, secondary and tertiary structure; relation of structure to function as exemplified by special protein systems. Prerequisites: Biochemistry 300 or 372 or equivalent. Chemistry 370 or 372.

BIOCH 541. *Nucleotide Metabolism.* ♦3 (Second Term, 3-0). The soluble nucleotides of animal and bacterial cells will be discussed from these viewpoints: chemical properties, synthetic and analytical methods; biosynthesis; catabolism; control mechanisms in nucleotide metabolism; carcinostatic antimetabolites. Prerequisites: Biochemistry 300 or 372 or equivalent.

BIOCH 561. *Chemistry of the Erythrocyte.* ♦3 (Second Term, 3-0). A lecture course on recent advances in the chemistry of mammalian erythrocytes, to include: structure and composition; the hemoglobins; metabolism and biochemical lesions; permeability and cation transport; the life span; blood storage. Prerequisities: Biochemistry 300 or 372 or equivalent.

BIOCH 571. *Recent Advances.* ♦0 (2-0). A seminar course on topics of current interest in Biochemistry. Note: Open to graduate students in Biochemistry only.

## 184.5 / *Biology*

Departments of Botany, Entomology, Genetics, Microbiology, and Zoology

BIOL 130. *Introductory Biology.* ♦6 (3-3). Note: not open to students with credit in Biology 30.

BIOL 230. *Intermediate Biology.* ♦6 (3-3). Note: designed for students with High School Biology 30. Prerequisite: Biology 30 or Biology 130.

BIOL 415. *History and Theory of Biology.* ♦3 (First Term, 3-0). An outline of biological discovery from early times to the present, and of the principal ideas stemming from or influencing the life sciences; both in relation to social, historical and cultural developments. Especially recommended to honors students in the biological subjects, but open to general students interested in the history of science as a force in the development of culture. Prerequisite: Biology 230.

BIOL 445. *Cell Physiology.* ♦3 (Second Term, 3-3). Current advances in cell biology. The integration of biochemical and structural changes with cell function. Prerequisites or corequisites: Biochemistry 300 or Plant Physiology and Biochemistry 431 and 432 or consent of the Department.

BIOL 584. *Biological Ultrastructure.* ♦3 (First Term, 3-0). Pre- or corequisites: Zoology 481 or Botany 507 or Microbiology 402 or consent of the Departments.

BIOL 585. *Electron Microscopy.* ♦3 (Second Term, 3-3). Prerequisite: Consent of the Department. (Not offered 1968-69.)

BIOL 620. *Seminar in Selected Topics of Modern Biology.* ♦0 (Second Term, 3-0). Prerequisite: Consent of the Department.

## 184.6 / *Botany*

BOT 300. *Flowering Plants.* ♦6 (3-3). The origin and evolution of flowering plants; their morphology and classification; species concepts; plants in relation to their environment, principles of nomenclature. Prerequisite: Biology 230 or consent of the Department.

BOT 301. *Flora of Alberta I.* ♦3 (First Term, 2-4). A survey of the nonvascular plants of Alberta with emphasis on identification. Prerequisite: Biology 230 or consent of the Department.

BOT 302. *Flora of Alberta II.* ♦3 (Second Term, 2-4). A survey of the vascular plants of Alberta with emphasis on identification. Prerequisite: Biology 230 or consent of the Department.

BOT 310. *Plant Anatomy and Histology.* ♦6 (3-3). The structure and development of organs and tissues of the higher plants. Emphasis on the experimental approach to anatomical studies and on the environmental and physiological control of development and morphology. Prerequisite: Biology 230 or consent of the Department.

BOT 320. *Introductory Plant Physiology.* ♦6 (3-3). A general course in plant physiology including: recent advances in water relations, permeability, active uptake of salts, enzymes, respiration, photosynthesis, intermediary metabolism, nitrogen assimilation and translocation. Prerequisites or corequisites: Biology 230, Chemistry 230, Chemistry 250 or 350, or consent of the Department.

BOT 321. *Plant Geography.* ♦3 (First Term, 3-0). The earth's main vegetational types and the significance of their present day distribution. Prerequisites: Biology 230 and Geography 201, or consent of the Department. Notes: Normally to be taken in sequence with Zoology 321. Open to students in the third year of Botany and Zoology programs and to students in the Geography programs.

BOT 331. *Phycology.* ♦3 (First Term, 3-3). The structure, physiology and classification of the algae with special reference to Alberta plants. Consideration of the evolution of these plants and their role in nature. Prerequisite: Biology 230 or consent of the Department.

BOT 332. *Lichens and Bryophytes.* ♦3 (either term, 3-3). Approximately half the course deals with structure, physiology and classification of the lichens, and half with structure classification and ecology of the bryophytes. Prerequisite: Biology 230 or consent of the Department.

BOT 341. *Mycology.* ♦3 (First Term, 3-3). A systematic survey of the fungi with detailed study of representatives of major groups. Emphasis on classification, life cycles, and distribution. Prerequisite: Biology 230 or consent of the Department.

BOT 342. *Physiology of Fungi.* ♦3 (Second Term, 3-3). Factors affecting growth and reproduction of fungi; beneficial and harmful activities of fungi. Prerequisite: Biology 230 and Botany 341 or consent of the Department.

BOT 351. *Seedless Vascular Plants.* ♦3 (First Term, 3-3). The structure, reproduction and classification of the seedless vascular plants with emphasis on their evolution and their place in the history of terrestrial vegetation. Prerequisite: Biology 230 or consent of the Department. Prerequisite or corequisite: Botany 310.

BOT 352. *The Gymnosperms.* ♦3 (Second Term, 3-3). The structure and evolution of the Gymnospermae; taxonomy and geographic distribution of living gymnosperms. Prerequisite: Biology 230 or consent of the Department. Prerequisite or corequisite: Botany 310.

BOT 360. *Paleobotany.* ♦6 (3-3). The fossil record of plants as it relates to the evolutionary history of existing groups. Prerequisite: Botany 310, Geology 201 or consent of the Department.

BOT 400. *Special Problems.* ♦6 (6L). Assigned reading and laboratory research projects in a field selected from: plant morphology, biochemistry, plant geography, ecology, morphogenesis, mycology, paleobotany, phycology, physiology, taxonomy. Prerequisites: Biology 230 and one senior course in Botany.

BOT 401. *Special Problems.* ♦3 (either term, 6L). A one-term course corresponding to Botany 400. Assigned reading and laboratory research projects in a field selected from: plant morphology, biochemistry, ecology, plant geography, morphogenesis, mycology, paleobotany, phycology, physiology, taxonomy. Prerequisites: Biology 230 and one senior course in Botany.

BOT 403. *Field Course in Botany.* ♦6. A two-week field survey of the terrestrial and aquatic flora and vegetation of Alberta and adjacent regions. Course offered in late summer immediately prior to registration week. Alternate years. Note: Required for Honors B.Sc. in Botany and should be taken in either the third or fourth year.

BOT 420. *Seminar in Botany.* (1s-0). Note: Required of all senior and graduate students.

BOT 422. *Plant Ecology.* ♦3 (First Term, 3-4). Ecological principles and relationships at the organism, population and community levels. Emphasis on the plant and the ecosystem. Laboratory will consist of field trips and greenhouse-growth chamber experiments. Prerequisite: Biology 230 or consent of the Department.

BOT 450. *Intermediate Plant Physiology I.* ♦3 (First Term, 3-3). The physiology of growth dormancy and seed germination. The translocation of organic material in plants. Prerequisite or corequisite: Botany 320 or consent of the Department.

BOT 451. *Intermediate Plant Physiology II.* ♦3 (either term, 3-3). The plant in relation to water, drought resistance, winter hardiness, mineral nutrition. Prerequisite or corequisite: Botany 320 or consent of the Department.

BOT 504. *Advanced Mycology.* Weight varies according to work done; maximum ♦6 (6L). Review of current literature with experimental study of a selected problem. Prerequisite: Botany 341 and 342 or consent of the Department.

BOT 506. *Advanced Taxonomy.* ♦6 (6L). Speciation and species problems in the flowering plants; cytotaxonomy and the use of the experimental methods in taxonomy. Prerequisite: Botany 300 or consent of the Department.

BOT 507. *Advanced Plant Anatomy and Histology.* ♦6 (6L). Modern methods of preparing plant material for microscopic examination, with practice in fixing, embedding, cutting and staining. Prerequisite: Botany 310 or consent of the Department.

BOT 508. *Vegetation Analysis.* ♦3 (Second Term, 3-3). The description and classification of plant communities. Sampling methods and treatment of data. Prerequisites: Botany 422, Statistics 255 or Biometrics 455, or consent of the Department.

BOT 510. *Environment Analysis.* ♦3 (First Term 3-4). The theory and description of environment and organism habitat relationships. Methods of measurement, treatment of data, correlation and causation. Laboratory will consist of field observations and demonstration of instrumentation. Prerequisites: Botany 422 or Zoology 462, or consent of the Department.

BOT 511. *Advanced Plant Ecology.* ♦3 (Second Term, 3-0). Development of ecological concepts and principles, especially those relating to the theory and classification of vegetation. Seminar discussion of several schools of ecological thought. Prerequisites: Botany 422 or equivalent, or consent of the Department.

BOT 521. *Plant Geography II.* ♦3 (Second Term, 3-0). Plant distribution patterns and the theories advanced to explain them. Prerequisite: Botany 321. Prerequisite or corequisite: Botany 300.

BOT 531. *Advanced Phycology.* Weight according to work done; maximum ♦6 (6L). Special problems in the study of algae involving laboratory projects and reading of current literature. Prerequisites: Botany 331, or consent of the Department.

BOT 560. *Advanced Paleobotany.* ♦6 (6L). Special problems in paleobotany involving laboratory techniques and reading of current literature and oral and written presentations. Prerequisites: Botany 360, Geology 201 or consent of the Department.

## 184.7 / *Chemistry*

CHEM 130. *Introductory General Chemistry.* ♦6 (3-3). A beginning course in Chemistry. It includes the topics of high school chemistry but is given from a more advanced point of view. This course may not be taken for credit by students who have credit in Grade XII Chemistry 30.

CHEM 230. *Inorganic Chemistry.* ♦6 (3-1s-3). The fundamental concepts of Chemistry as applied to the elements and their compounds. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

CHEM 250. *Organic Chemistry.* ♦6 (3-1s-3). Introduction to a study of the compounds of carbon. Prerequisite: Chemistry 130 or Chemistry 30 or equivalent. Notes: Students with credit in Chemistry 230 normally will proceed to Chemistry 350, not 250. Students not concurrently taking Chemistry 230 are required to take the one-hour seminar.

CHEM 300. *The Development of Chemical Concepts.* ♦6 (3-1s). Three or four selected areas will be discussed in some detail with a view to exploring the evolution of some chemical concepts, their usefulness and limitations. This course is intended to serve as a science option for B.A. students. It may not be used for credit on a B.Sc. program. Note: Not offered 1968-69.

CHEM 312. *Quantitative Analysis.* ♦6 (3-6). Prerequisite: Chemistry 230 or 232.

CHEM 350. *Organic Chemistry.* ♦6 (3-3). An introduction to a study of the compounds of carbon. Prerequisite: Chemistry 230 or 232. NOTE: Students who have obtained credit for Chemistry 250 cannot take Chemistry 350 for credit.

CHEM 370. *Elementary Physical Chemistry.* ♦6 (3-3). The laws of thermodynamics; states of matter; solutions; equilibrium; phase rule; electrochemistry; colloids; kinetics of reaction. Prerequisite: Chemistry 230 or 232. Prerequisite or corequisite: Mathematics 180 or 201 or 206 or 207 or 214 or consent of the Department.

CHEM 372. *Elementary Physical Chemistry.* ♦6 (3-1s-3). Gases and liquids; laws of thermodynamics; solutions; free energy and chemical equilibrium; the phase rule; electrochemistry. Prerequisites: Chemistry 230 or 232; Physics 200 or 240. Prerequisite or corequisite: Mathematics 304. Note: For honors students only, except by consent of the Department.

CHEM 430. *Inorganic Chemistry.* ♦6 (3-3). Underlying principles of the subject followed by a study of the periodic table. Prerequisite: Chemistry 230. Prerequisites or corequisites: Chemistry 370 or 372, and 312.

CHEM 450. *Organic Chemistry.* ♦6 (3-3). Mechanisms and reactions of aromatic and aliphatic compounds. Prerequisites: Chemistry 230 or 232, and 250 or 350. Prerequisites or corequisites: Chemistry 370 or 372, and 312.

CHEM 470. *Advanced Physical Chemistry.* ♦6 (3-3). Prerequisite: Chemistry 370. Prerequisite or corequisite: Mathematics 304. Note: Not offered 1968-69.

CHEM 501. *Chemical Research.* ♦3 (Second Term, 0-8). Students in their fourth year of honors will pursue a half-course in investigational work under the direction of a member of the Department.

CHEM 503. *Special Topics in Chemistry (1968).* ♦3 (either term, 3-0).

CHEM 511. *Instrumentation in Chemical Analysis.* ♦3 (First Term, 3-6). Prerequisites: Chemistry 312; 370 or 372; Physics 340.

CHEM 513. *Electronics for Scientists.* ♦3 (Second Term, 3-3). Prerequisite: Consent of the Department.

CHEM 515. *Electroanalytical Chemistry and Polarography.* ♦3 (First Term, 3-0). Prerequisite: Chemistry 511, or consent of the Department.

CHEM 530. *Inorganic Chemistry.* ♦6 (3-3). Bonding, structure and chemical properties of compounds, most of which do not contain carbon. Prerequisite or corequisite: Chemistry 583.

CHEM 533. *Structure in the Solid State.* ♦3 (Second Term, 3-0). An introduction to x-ray crystallography.

CHEM 535. *Selected Topics in Advanced Inorganic Chemistry.* ♦3 (Second Term, 3-0). Selected topics including organometallic compounds, hydrides and metal carbonyls. Prerequisite: Chemistry 530, or consent of the Department.

CHEM 550. *Organic Chemistry.* ♦6 (3-6). A continuation of Chemistry 250 or 350. Prerequisites: Chemistry 250 or 350; 312; and 370 or 372.

CHEM 551. *Qualitative Organic Analysis.* ♦3 (First Term, 2-6). Prerequisite: Chemistry 450 or 550.

CHEM 553. *Chemistry of Carbohydrates.* ♦3 (Second Term, 3-0). Prerequisite or corequisite: Chemistry 450 or 550.

CHEM 555. *Theoretical Organic Chemistry.* ♦3 (First Term, 3-0). Prerequisite: Chemistry 550.

CHEM 557. *Free Radical Reactions in Organic Chemistry.* ♦3 (Second Term, 3-0). Prerequisite: Chemistry 555.

CHEM 559. *Natural Products.* ♦3 (Second Term, 3-0). Prerequisites: Chemistry 550 and 551.

CHEM 561. *Advanced Organic Synthesis.* ♦3 (First Term, 3-0). Prerequisite: Chemistry 450 or 550.

CHEM 563. *Heterocyclic Chemistry.* ♦3 (Second Term, 3-0). Prerequisite or corequisite: Chemistry 551.

CHEM 572. *Advanced Physical Chemistry.* ♦6 (3-6). Prerequisite: Chemistry 372.

CHEM 573. *Electrochemistry.* ♦3 (Second Term, 3-0). Prerequisites: Chemistry 312 and 372.

CHEM 583. *Quantum Chemistry.* ♦3 (Second Term, 3-0). Prerequisite: Chemistry 370 or 372.

CHEM 587. *Special Topics in Free Radical Chemistry.* ♦3 (Second Term, 3-0).

CHEM 589. *Statistical Mechanics.* ♦3 (Second Term, 3-0). Prerequisite: Chemistry 583, or consent of the Department.

CHEM 591. *Radiation Chemistry.* ♦3 (First Term, 3-0). Prerequisite: Chemistry 370 or 372.

CHEM 593. *Molecular Spectroscopy.* ♦3 (Second Term, 3-0). Prerequisite: Chemistry 583.

CHEM 595. *Photochemistry.* ♦3 (First Term, 3-0).

CHEM 597. *Macromolecular Chemistry.* ♦3 (First Term, 3-0). Prerequisite: Chemistry 572, or consent of the Department.

CHEM 599. *Chemical Applications of Mass Spectrometry.* ♦3 (First Term, 3-0).

CHEM 602. *Departmental Research Seminar.* (2s-0). Required each year of all graduate students in the Department of Chemistry. Fourth year honors students must attend, but do not register in the course nor present any seminar papers.

CHEM 604. *Advanced Research Seminar.* Reports on topics related to the fields of specialization of the graduate student. These seminars will be set up by the various staff members as required.

CHEM 615. *Advanced Analytical Chemistry.* ♦3 (First Term, 3-0).

CHEM 617. *Analytical Spectroscopy.* ♦3 (Second Term, 3-0).

CHEM 637. *Topics in Structural Inorganic Chemistry.* ♦3 (Second Term, 3-0). Prerequisite: Chemistry 530, or consent of the Department.

CHEM 639. *Inorganic Reaction Mechanisms.* ♦3 (First Term, 3-0). Prerequisite: Chemistry 530, or consent of the Department.

CHEM 641. *X-ray Crystallography.* ♦3 (First Term, 3-0). Prerequisite: Chemistry 533.

CHEM 655. *Physical Methods of Organic Chemistry.* ♦3 (First Term, 3-0). Prerequisites: Chemistry 551 and 555.

CHEM 657. *Physical Organic Chemistry.* ♦3 (Second Term, 3-0). A continuation of topics discussed in Chemistry 555.

CHEM 670. *Advanced Physical Chemistry.* ♦6 (3-0). Kinetic theory of gases, quantum mechanics, statistical mechanics, chemical kinetics and photochemistry. Prerequisite: Chemistry 372. Prerequisite or corequisite: Mathematics 404.

CHEM 675. *Magnetic Resonance Spectroscopy.* ♦3 (First Term, 3-0). Prerequisites: Chemistry 583 and Mathematics 404.

CHEM 677. *Physical Chemistry.* ♦3 (First Term, 3-0). Lectures of the first term of Chemistry 572.

CHEM 679. *Chemical Kinetics.* ♦3 (Second Term, 3-0). Lectures of the second term of Chemistry 572.

CHEM 683. *Quantum Chemistry.* ♦3 (Second Term, 3-0). Prerequisite: Chemistry 583.

CHEM 685. *Solution Kinetics.* ♦3 (Second Term, 3-0). Prerequisites: Chemistry 372, and one of Chemistry 555 or 572 or 679.

## 184.8 / *Computing Science*

CMPUT 212. *Introduction to Computing Science.* ♦6 (3-0). Structure of computers, computer logic, and storage and representation of information. Assembler and compiler languages. Construction of algorithms and programs. The role of computers in science, industry, and business. The student will use the computer to run programs in batch mode and also through remote terminals.

CMPUT 305. *Computing Methods for Compilers and Remote Terminals.* ♦3 (First Term, 3-0). Illustration of compiler language programming through the FORTRAN language. Representation of data and organization of scientific programming. Use of on-line remote terminals and the APL programming language. Note: Designed for students enrolled in Honors Physics.

CMPUT 310. *Elements of Programming.* ♦6 (3-0). Structure of computers; instructions, algorithms and programs; languages of computer programming; conventional computers; assemblers and compilers.

CMPUT 311. *Elements of Programming.* ♦6 (3-0). Representation of information; structure of computers; instructions, algorithms and programs; computer languages; conventional computers; assemblers and compilers; problem-oriented languages. Prerequisites: Mathematics 206 and 271.

Note: This course is intended primarily for Honors students in Computing Science. Other students may be admitted only with the consent of the Department.

CMPUT 312. *Probability, Statistics and Numerical Analysis.* ♦6 (3-2). Prerequisites: Mathematics 206 or 201 and Mathematics 271 or 270.

CMPUT 313. *Computer Programming.* ♦3 (Second Term, 3-0). 360 system architecture, assembler language programming, higher level language. Introduction to design of assemblers and compilers.

CMPUT 411. *Computer Languages and Their Processors.* ♦6 (3-0). Prerequisites: Computing Science 310 or 311, or consent of the Department.

CMPUT 440. *Linear Programming and Matrix Algebra.* ♦3 (Second Term, 3-0). Prerequisites: Mathematics 30, and an introductory course in Computing Science. Note: Not open to students with credit in Mathematics 243.

CMPUT 450. *Digital and Analog Computers with Applications in Chemistry.* ♦3 (Second Term, 3-3/2).

CMPUT 459. *Introduction to Scientific Programming.* ♦3 (First Term, 3-0). Prerequisites: Open to fourth-year and graduate students with at least one university course in Mathematics or Statistics. Not open to students with credit in any introductory course in Computing Science.

CMPUT 460. *Numerical Analysis.* ♦6 (3-0). Prerequisites: Mathematics 306 and 425.

CMPUT 461. *The Structure of Digital Machines.* ♦6 (3-0). Prerequisites: Computing Science 312 and Physics 340 or consent of the Department.

CMPUT 511. *Computer Graphics.* ♦3 (either term, 3-0). Prerequisite: Computing Science 411 or consent of the Department.

CMPUT 540. *Linear Programming.* ♦6 (3-0). Prerequisite: Computing Science 460.

CMPUT 550. *Artificial Intelligence.* ♦6 (3-0). Note: This course is open to senior or graduate students in Computing Science or Behavioral Sciences (e.g. Psychology, Educational Psychology).

CMPUT 560. *Fundamentals of Information Retrieval.* ♦6 (3-0). Prerequisite: Consent of the Department.

CMPUT 561. *Computing Systems.* ♦6 (3-0). Prerequisites: Computing Science 411 and 461.

CMPUT 570. *Introduction to Automata Theory.* ♦6 (3-0). Prerequisite: Computing Science 461 and Mathematics 425.

CMPUT 640. *Advanced Numerical Analysis.* ♦6 (3-0). Prerequisites: Computing Science 460, Mathematics 421 and 426.

CMPUT 650. *Advanced Topics in Computing Science.* ♦6 (3-0).

## 184.9 / *Entomology*

Department of Entomology, Faculty of Agriculture

ENT 200. *Introduction to General and Agricultural Entomology.* ♦3 (Second Term, 3-3). Structure and life cycles of insects and related Arthropods. Introduction to classification and to ecology. Agricultural importance. Prerequisite: Biology 30 or 130 or equivalent.

ENT 302. *Survey of Entomology.* ♦3 (First Term, 3-3). Lives of insects and related Arthropods from a functional viewpoint. Ecology and applied entomology. Prerequisite: Zoology 350 or Entomology 200.

ENT 317. *Insect Morphology.* ♦3 (First Term, 3-0). Structure and function of insects from the comparative and functional viewpoints. Textbooks: Snodgrass, *Principles of Insect Morphology;* Matsuda, *Morphology and Evolution of the Insect Head.* Prerequisites: Entomology 200, 201, or 302. Corequisite: Entomology 318.

ENT 318. *Laboratory in Morphology.* ♦6 (6L). Practical work related to Entomology 317. Corequisite: Entomology 317.

ENT 471. *Project in Applied Entomology.* A survey of the literature on one or more topics in applied entomology with or without an experimental study of a related simple problem. Weight according to work done to a maximum of ♦6.

ENT 476. *Insect Toxicology.* ♦6 (2-4). Selective toxicity principles. Chemistry, mode of action, and metabolism of insecticides and repellents. Textbook: O'Brien, *Insecticides, Action and Metabolism.* Prerequisite: Chemistry 230 and 250 or 350, Entomology 200 or 302 desirable.

ENT 527. *Insect Taxonomy.* ♦3 (First Term, 3-0). Principles and procedures. Classification of insects. Zoological nomenclature. Speciation, phylogeny and zoogeography. Prerequisite: Entomology 317 desirable. Corequisite: Entomology 528 or consent of instructor.

ENT 528. *Insect Taxonomy.* ♦6 (0-6). A laboratory study related to Entomology 527. Prerequisite or corequisite: Entomology 527.

ENT 560. *Insect Ecology.* ♦6 (2-5). Relationships of insects to their environment. Community interactions. Prerequisite: Entomology 201 or 200 and 471.

ENT 610. *Advanced Morphology and Histology.* Continuing from Entomology 314 including a detailed study of internal structure. Weight according to work done to a maximum of ♦6. Prerequisite: Entomology 317.

ENT 621. *Advanced Taxonomy.* Classification and biology of, and literature on, one or more of the major orders. Weight according to work done to a maximum of ♦6. Prerequisite: Entomology 522.

ENT 650. *Project in Insect Physiology.* A review and interpretation of literature on a selected topic with an experimental study of a related problem. Weight according to work done to a maximum of ♦6. Prerequisite: Entomology 556.

## 184.10 / *Genetics*

GENET 351. *Principles of Genetics.* ♦6 (3-3). Prerequisite: Biology 30 or 130.

GENET 352. *Principles of Genetics.* ♦6 (3-0). Content the same as Genetics 351, without laboratory exercises. Prerequisite: Biology 30 or 130. Note: Not normally permitted for Science students.

GENET 360. *Basic Concepts in Genetics.* ♦3 (Second Term, 3-3). Prerequisite: Biology 30 or 130.

GENET 420. *Genetics of Bacteria and Viruses.* ♦3 (First Term, 3-0). Basic genetic mechanisms in bacteria and the bacteriophages. Prerequisite: Genetics 351, or consent of the Department. (Not offered 1968-69.)

GENET 430. *Fungal Genetics.* ♦3 (First Term, 3-0). Prerequisite: Genetics 351 or equivalent, or consent of the Department.

GENET 445. *Biochemical Genetics.* ♦3 (Second Term, 3-0). Molecular mechanisms of gene expression and regulation. Prerequisite: Genetics 351, or consent of the Department. Genetics 420 is recommended.

GENET 463. *Principles of Plant Breeding.* ♦3 (Second Term, 3-0). Prerequisite: Genetics 351 or 360.

GENET 465. *Human Genetics.* ♦3 (First Term, 3-0). Prerequisite: Genetics 351 or equivalent, or consent of the Department. (Not offered 1968-69.)

GENET 481. *Population Genetics.* ♦3 (First Term, 3-0). Prerequisite: Genetics 351 or equivalent. (Not offered 1968-69.)

GENET 483. *Evolutionary Genetics.* ♦3 (Second Term, 3-0). Prerequisite: Genetics 481. (Not offered 1968-69.)

GENET 505. *Reading or Research Project.* ♦3 or 6.

GENET 511. *Cytology.* ♦3 (First Term, 3-3). Prerequisite: Chemistry 250 or equivalent, and Genetics 351 or equivalent.

GENET 515. *Cytogenetics.* ♦3 (Second Term, 3-3). Prerequisite: Genetics 351 or equivalent.

GENET 517. *Mathematical Foundations of Genetic Analyses.* ♦3 (Second Term, 3-3). Prerequisite: Genetics 351 or equivalent and Mathematics 242.

GENET 520. *Quantitative Genetics.* ♦3 (Second Term, 3-0). Prerequisite: Genetics 351 or equivalent. (Not offered 1968-69.)

GENET 552. *Radiation Genetics.* ♦3 (Second Term, 3-0). Prerequisite: Genetics 351 or consent of the Department.

GENET 586. *Developmental Genetics.* ♦3 (First Term, 3-0). Prerequisite: Genetics 351 or equivalent or consent of the Department. (Not offered 1968-69.)

GENET 601. *Advanced Genetics.* A seminar course on advanced and current topics of genetics.

## 184.11 / *Geography*

GEOG 201. *Physical Geography.* ♦6 (3-2-3). A systematic study of the origin, nature, and distribution of the natural environment. Land forms, weather and climate, vegetation, soils, water, and mineral resources as related to each other in place. Laboratory work will include interpretation, study, and preparation of maps and charts.

GEOG 301. *Cartography.* ♦6 (6L-6L). History of graphic technology and cartography. Topographic mapping; documentation of data (survey) recording of data (compilation and manuscript) and map reproduction. Reference grids, Canadian and foreign mapping agencies. Derived maps. Map projections. Geographical atlases. Reproduction methods. Photo interpretation. Practical work: map reading, cartographic expression and map appreciation.

GEOG 303. *Weather and Climate.* ♦6 (3-3). A survey of weather processes and phenomena, regional weather patterns, climatic classification, and climates of the continents, with some consideration of climatic change. First term work will concentrate on weather elements and physical weather processes: temperature, wind, cloud forms, circulation patterns, storms, etc. The second term will be devoted to climatology. Laboratory assignments: analysis of simple weather maps, studies of local and regional weather patterns, and interpretation of climatic data. Note: A student cannot receive credit for both Geography 303 and Meteorology 307. Science students are advised to take Meteorology 307.

GEOG 309. *Intermediate Physical Geography.* ♦6 (3-3). Climate, vegetation, soil, water and landforms with stress upon local, regional and world patterns of each. Prerequisite: Geography 201 or consent of the Department.

GEOG 401. *Advanced Physical Geography.* ♦6 (3L). Terrain analysis; field and laboratory research techniques in the analysis of physical landscape systems. Prerequisite: Geography 309 or consent of the Department.

GEOG 403. *Microclimatology.* ♦3 (Second Term, 3). The climate of the lowest layers of the atmosphere. The relation of microclimatology to topography, plant and animal habitat, and man.

GEOG 407. *Arid Lands.* ♦6 (3S-0). A systematic and regional survey of the world's dry lands in the low and mid-latitudes. An analysis of environmental factors and problems of human adjustment associated with semi-arid and arid regions. Prerequisite: Geography 201 and a second course in Geography, or consent of the Department.

GEOG 418. *Geography of Water Resources.* ♦6 (3L-3L). Local, regional and world patterns of water supply and demand. Precipitation, evapotranspiration, streamflow, soil moisture, ground water and the management of watershed regions. Domestic, municipal, industrial, irrigation, hydro-power, navigational, fishing, recreational and other demands and the problems of supply, modification and allocation. Prerequisite: Geography 201 or consent of the Department.

GEOG 441. *Economic and Social Mapping.* ♦6 (6L-6L). Map classification. Cartographic methods for qualitative and quantitative mapping. Regional and national atlases. Practical work: graphic representation, reading and appreciation of special maps. Planning of special atlases. Prerequisite: Geography 301 or consent of the Department. Corequisite: Statistics 255.

GEOG 501. *Air Photo Interpretation.* ♦6 (6L-6L). Physical and cultural geography depicted on vertical and oblique air photos. Interpretation techniques, field use of photos and the elements of photogrammetry. Prerequisite: A course in Geography or consent of the Department.

GEOG 502. *Reading and Seminar Course.* ♦6.

GEOG 503. *Climatology.* ♦3 (First Term, 3). The concept of the "normal climate"; Pleistocene climates and the research techniques for their reconstruction; postglacial and recent climatic fluctuations and the general circulation, their influence on plant life; the purpose and success of classification of climates; the concept of potential evapotranspiration; use of climatic knowledge in the service of man—application of Bioclimatology. Prerequisite: Consent of the Department.

GEOG 523. *Geographic Concepts and Research Methods.* ♦6 (3-3). Current concepts and research methods with some consideration of their historical development. Consideration of the role of theory in research, and of the organization of field study. Prerequisite: Consent of the Department. Note: Required of all first year graduate students and fourth year Honors students in Geography.

GEOG 525. *Field School in Geography.* ♦2. A survey of the geography of a selected region. Field studies for a week in September preceding registration, followed by the preparation of reports on specified topics. Reconnaissance and microstudies employing geographical field techniques. Note: Required of candidates for the Master's degree in Geography.

GEOG 541. *Cartographic Design and Editing.* ♦6 (6L-6L). Editorial, planning and management aspects of cartography; map design. Prerequisite: Geography 301 or 441 or consent of the Department.

GEOG 551. *Research in Physical Geography.* ♦6.

GEOG 553. *Special Research Problems.* ♦6.

GEOG 561. *Water Resources.* ♦6 (3L). A regional analysis of water supply and demand patterns and of problems relating to both. Prerequisite: Consent of the Department.

GEOG 631. *Advanced Research in Physical Geography.* ♦6.

GEOL 201. *General Geology.* ♦6 (3-3). An introduction to the study of the earth's nature, history and origin, of the various processes which operate on and below its surface, and of the plants and animals which have lived on its surface, with emphasis on the following topics: composition, structure and state of the earth; minerals and rocks; ground water and water supply; weathering and soils; erosion; deposition; igneous activity; mountain building; geologic history; fossils.

GEOL 202. *Physical Geology.* ♦3 (First Term, 3-3). An introduction to the study of the earth emphasizing the following topics: composition, structure and state of the earth; minerals and rocks; ground water and water supply; weathering and soils; erosion; deposition; igneous activity; mountain building.

GEOL 203. *Historical Geology.* ♦3 (Second Term, 3-3). An introduction to the study of the history of the earth, emphasizing the following topics: geological time; fossils; development and history of life on the earth; paleography; the stratigraphic column; the glacial epoch. Prerequisite: Geology 202 or Geography 201.

GEOL 301. *Earth Science.* ♦6 (3-0). History of the development of geology as a natural science; modern trends in earth science; selected topics of current interest in physical and historical geology, such as continental drift, glaciation, formation of mountains and ocean basins, geologic time, history of life on the earth; field trips, demonstrations. Note: Not available to students in the Faculty of Science, or those who already have Geology 201 or equivalent.

GEOL 302. *Geology and Mineral Deposits of Canada.* ♦6 (3-0). The geologic regions of Canada; their stratigraphy, structure and mineral deposits. Extensive use of maps, sections, suites of demonstration minerals and rocks, and assigned readings. Prerequisite: Geology 201 or 301. Note: Designed for students not majoring in Geology.

GEOL 305. *Principles of Paleontology.* ♦3 (First Term, 3-3). Morphology, paleoecology, and evolution of the Porifera, Coelenterata, Brachiopoda, Mollusca, Echinoderma, and Trilobita. Prerequisite: Geology 201 or consent of the Department.

GEOL 306. *Principles of Sedimentation and Stratigraphy.* ♦3 (Second Term, 3-3). Sedimentary processes, environments and facies; properties and classification of sedimentary rocks; stratigraphic nomenclature and the stratigraphic column; principles of stratigraphic paleontology. Prerequisite: Geology 201 or consent of the Department.

GEOL 307. *Elementary Mineralogy.* ♦3 (First Term, 3-3). Principles of crystallography; physical and chemical properties of minerals; determinative mineralogy. Prerequisites: Geology 201, Mathematics 201 or consent of the Department.

GEOL 340. *Structural Geology I.* ♦3 (Second Term, 3-3). Geologic structures; stress and strain; principles of structural analysis. Prerequisites: Geology 307 and Physics 240 or consent of the Department.

GEOL 400. *Seminar in Geology.* ♦3 (Second Term, (3s-0). A seminar course stressing the interdisciplinary areas of geology. Note: To be taken by all candidates for the Honors and four-year degrees in geology.

GEOL 403. *Stratigraphy I.* ♦3 (First Term, 3-3). Historical geology of North America from the Precambrian to the Devonian; Cambrian to Devonian stratigraphic paleontology. Prerequisite: Geology 305 and 306.

GEOL 405. *Stratigraphy II.* ♦3 (Second Term, 3-3). Historical geology of North America from the Carboniferous to the Cenozoic; Carboniferous to Cenozoic stratigraphic paleontology. Prerequisite: Geology 305 and 306.

GEOL 407. *Paleontology.* ♦3 (Second Term, 3-3). Morphology, paleoecology and evolution of the lesser invertebrates, vertebrates, and plants. Prerequisite: Geology 305 or consent of the Department. Note: Alternate years only. Offered 1968-69.

GEOL 409. *Geochemistry.* ♦3 (First Term, 3-3). A survey of chemical processes taking place in geologic settings with emphasis on the abundance relationships of the elements in the earth's crust and the laws governing the migration and distribution of the elements of the earth. Prerequisite: Geology 454 and Chemistry 370, or consent of the Department. Note: Alternate years only. Offered 1968-69.

GEOL 410. *Micropaleontology.* ♦6 (3-3). Principles of micropaleontology, techniques, systematic treatment of Foraminifera. Prerequisite: Geology 305. Note: Alternate years only. Offered 1968-69.

GEOL 411. *Geochemical Prospecting.* ♦3 (First Term, 3-3). The application of geochemistry in the search for mineral deposits. Prerequisite: Consent of the Department. Note: Alternate years only. Not offered 1968-69.

GEOL 421. *Intermediate Mineralogy.* ♦3 (Second Term, 3-3). Chemical crystallography, theory of X-ray diffraction, and phase equilibria. Prerequisite: Geology 307 and Chemistry 370, or consent of the Department. Note: Alternate years only. Not offered 1968-69.

GEOL 440. *Structural Geology II.* ♦3 (First Term, 3-3). Additional mathematical treatment of structural data; primary penecontemporaneous and secondary structures; structural analysis of the Canadian Rocky Mountains; orogenesis and the growth of continents. Prerequisite: Geology 340. Note: Alternate years only. Not offered 1968-69.

GEOL 454. *Petrology.* ♦6 (3-3). Introduction to petrography; optical properties of common rock-forming minerals; classification and genesis of igneous and metamorphic rocks; examination of rock sections. Prerequisite: Geology 307.

GEOL 460. *Metallic Mineral Deposits.* ♦3 (Second Term, 3-3). Classification, mode of occurrence, and geological relations of various types of mineral deposits. Prerequisite: Geology 340 and 307 or consent of the Department.

GEOL 461. *Geology of Petroleum and Natural Gas.* ♦3 (First Term, 3-3). Origin, migration and accumulation of petroleum and natural gas. Geological characteristics of petroleum and natural gas deposits. Prerequisites: Geology 403 and 405 or consent of the Department. Note: Alternate years only. Not offered 1968-69.

GEOL 462. *Photogeology.* ♦3 (Second Term, 1-3). The application of aerial photographs to the preparation of planimetric and geological maps. Mapping of stratigraphy and structure on aerial photographs. Prerequisite: Geology 201 and 340 or consent of the Department. Note: Alternate years only. Not offered 1968-69.

GEOL 464. *Introductory Sedimentary Petrology.* ♦3 (Second Term, 3-3). Processes of sedimentation; weathering, transportation, deposition, diagenesis; classification and description of sedimentary rocks. Prerequisite: Geology 306 and 454. Note: Alternate years only, offered 1968-69.

GEOL 465. *Geomorphology.* ♦3 (First Term, 3-3). Land forms and the processes which create and modify them; weathering, mass-wasting, stream erosion, wave erosion, wind erosion, and glaciation; study of land forms on aerial photographs and topographic maps; field trips. Prerequisite: Geology 201 or consent of the Department.

GEOL 466. *Glacial Geology.* ♦3 (Second Term, 3-3). Elements of glaciology; description of glacial deposits and landforms; periglacial phenomena; outline of glacial stratigraphy of North America; interpretation of glacial features from topographic maps and aerial photographs; examination of glacial sediments; field trips. Prerequisite: Geology 201 or consent of the Department.

GEOL 467. *Field School.* A ten-day field school for third year students to be held following the Spring examination period. Topographic and geologic mapping techniques; detailed mapping of the stratigraphy and of the primary and secondary structures of a small highly deformed area. Prerequisite: Geology 340, 403 and 405, or consent of the Department.

GEOL 470. *Hydrogeology.* ♦3 (3L). The occurrence, distribution, movement and chemistry of groundwater as a function of the geological environment; groundwater as a geologic agent; methods of collection, organization and use of hydrogeologic data; groundwater budgets, model studies, selected problems and case histories. Prerequisite: Geology 201 and consent of the Department.

GEOL 476. *Pleistocene Stratigraphy.* ♦3 (First Term, 3-3). Definitions, terminology, and subdivisions of the Pleistocene Epoch; correlation; geochronology; stratigraphy of North America, Eurasia (with emphasis on western Europe); stratigraphy of deep-sea floor; faunal succession of the Pleistocene. Prerequisite: Geology 466 or consent of the Department. Note: Alternate years only, not offered 1968-69.

GEOL 501. *Advanced Structural Geology.* ♦3 (First Term, 3-0). Advanced structural topics will be treated on a seminar basis. Prerequisite: Geology 440 or consent of the Department: Note: Alternate years only. Offered 1968-69.

GEOL 502. *Sedimentary Petrology and Sedimentation.* ♦3 (2s-0). Seminar papers on sedimentary topics. Normally the First Term will be spent largely on mechanical sedimentation and the Second Term on chemical sedimentation. Prerequisite: Geology 464. Note: Alternate years only. Offered 1968-69.

GEOL 503. *Advanced Stratigraphy.* ♦6 (3-3). Note: Alternate years only. Not offered 1968-69.

GEOL 507. *Advanced Metamorphic Petrology.* ♦3 (either term, 3s-0). Classic and recent papers dealing with genesis of metamorphic rocks. Prerequisite: Geology 454 or consent of the Department. Note: Alternate years only. Offered 1968-69.

GEOL 508. *Precambrian Geology.* ♦3 (First Term, 3s-0). The geological record of Precambrian time, with special reference to the Canadian Shield. Prerequisite: Geology 454 and 403. Note: Alternate years only. Offered 1968-69.

GEOL 510. *Advanced Mineralogy.* ♦3 (First Term, 3-3). Mineral equilibria, both natural and synthetic. Prerequisite: Geology 421 or equivalent. Note: Alternate years only. Offered 1968-69.

GEOL 511. *Regional Structural Geology.* ♦3 (First Term, 3-3). Seminar on the geological structure of certain areas in different parts of the world. Prerequisite: Geology 440 or consent of the Department. Note: Alternate years only. Not offered 1968-69.

GEOL 512. *Pleistocene Geology.* ♦3 (First Term, (3s-0). Seminar on topics of current research interest in Pleistocene geology. Prerequisite: Geology 466 or consent of the Department. Note: Alternate years only. Offered 1968-69.

GEOL 513. *Field Work in Geomorphology and Glacial Geology.* ♦3 (either term). Mapping of surficial deposits and landforms of selected areas in central Alberta. One day of field work each week during one term. Prerequisite: Geology 465 and 466 or consent of the Department.

GEOL 514. *Rock Analysis.* ♦3 (either term). The quantitative chemical analysis of silicate rocks. Problems in sampling, solution, separations and final determination of the constituents. Prerequisite: Chemistry 312 or consent of the Department.

GEOL 515. *Advanced Micropaleontology.* ♦3 (either term, 2s-4). Note: Alternate years only. Not offerred 1968-69.

GEOL 516. *Advanced Paleontology.* ♦3 (either term, 3s-0). Note: Alternate years only. Not offered 1968-69.

GEOL 517. *Advanced Geochemistry.* ♦3 (Second Term, 3s-0). Note: Alternate years only. Offered 1968-69.

GEOL 522. *Advanced Sedimentary Petrography.* ♦3 (First Term, 1-3). The composition of detrital and chemical rocks using the petrographic microscope, with emphasis on the diagenetic history of sediments having high initial porosities and permeabilities, such as sandstones and clastic carbonates. Prerequisite: Geology 464 or equivalent. Note: Alternate years only. Offered 1968-69.

GEOL 565. *Quantitative Geomorphology.* ♦3 (Second Term, 3-3). Evaluation of basic concepts of quantitative geomorphology; evaluation and application of statistical techniques to the analysis of geomorphic data; measurements of properties of topography, including analysis of glacial terrain. Prerequisite: Geology 465 or its equivalent. Note: Alternate years only. Offered 1968-69.

GEOL 592. *Organic Geochemistry.* ♦3 (Second Term, 3s-0). The origin and geochemical behaviour of major groups of organic compounds occurring in terrestrial rocks; hydrocarbons, fatty acids, morphyrins, amino acids, sugars, asphalts, fats, pigments, proteins, starches, lignins, and kerogens; geochemical processes as a function of geologic time; prebiotic systems and the origin of terrestrial life; cosmic organic geochemistry. Prerequisite: Geology 409 or consent of the Department. Note: Alternate years only. Not offered 1968-69.

GEOL 609. *Geologic Research.* ♦3 (either term, 0-8).

GEOL 610. *Isotope Geology.* ♦3 (Second Term, 3-0). The investigation and elucidation of geologic phenomena by means of variations in the natural isotopic composition of the elements; abundance of the naturally occurring nuclides; isotopic fractionation; radioactivity; geochronology. Prerequisite: Consent of the Department. Note: Alternate years only. Not offered 1968-69.

GEOL 611. *Palynology.* ♦3 (either term, 3s-3). Note: Alternate years only. Not offered 1968-69.

GEOL 612. *Ore Deposits.* ♦3 (First Term, 3s-0). Note: Alternate years only. Not offered 1968-69.

GEOL 613. *Mineralogy Seminar.* ♦3 (3s-0). Topics covering recent work in mineralogy. Note: Alternate years only. Not offered 1968-69.

MATH 100. *Elements of Algebra.* ♦6 (3-0). The topics of Mathematics 30.

MATH 101. *Trigonometry.* ♦0 (First Term, 2-0). Trigonometric functions, equations, and identities. Solution of triangles. Logarithms. Prerequisite: 70% standing in Mathematics 30 and 70% standing in the required courses of Grade XII or special permission of the Dean. Note: This course cannot be taken for credit towards a degree.

MATH 180. *Trigonometry and Polynomial Calculus.* ♦6 (4-0). Trigonometric functions and identities. Solution of triangles. Simple algebraic curves. Differentiation and integration of elementary functions. Applications. Prerequisite: Mathematics 30 or its equivalent.

MATH 201. *Introductory Calculus.* ♦6 (5-0). Rates of change. Differentiation and integration of simple functions. Applications. Analytic geometry of the conic sections. Exponential, logarithmic and trigonometric functions. Prerequisite: Mathematics 30 and 31 or their equivalents. Corequisite: Some students lacking Mathematics 31 or its equivalent may take Mathematics 201 by taking Mathematics 101 concurrently. (See the conditions under which a student may take Mathematics 101.)

MATH 206. *Calculus.* ♦6 (5-0). Functions. Derivatives and antiderivatives. The differential. The integral and its applications. Fundamental Theorem. Differentiation and integration of elementary functions of one or more variables. Simple differential equations. Prerequisites: Mathematics 30 and 31 or their equivalents. Note: This course is recommended for students with at least a 75 per cent grade in Mathematics 30. Other students may be admitted with the consent of the Department.

MATH 207. *Elementary Calculus (Arts and Education).* ♦6 (5-0). Real numbers. Functions and graphs. Differentiation and applications. Analytical geometry. Integration and applications. Trigonometric, exponential and inverse functions. Prerequisite: Mathematics 30 and 31 or their equivalents. Corequisite: Some students lacking Mathematics 31 or its equivalent may take Mathematics 207 by taking Mathematics 101 concurrently. (See the conditions under which a student may take Mathematics 101).

MATH 220. *Elementary Calculus.* ♦6 (3-0). Differentiation and integration of trigonometric functions. Polar co-ordinates. Logarithmic and exponential functions. Conic sections. Areas and volumes. Prerequisites: Mathematics 180.

MATH 240. *Algebra and Elementary Calculus.* ♦3 (either term, 3-1). Elementary algebraic operations. Graph of polynomial functions. Exponents and logarithms. Permutations and combinations. The Binomial Theorem. Arithmetic and geometric progressions. Calculus of polynomial functions. Maxima and minima. Prerequisite: Mathematics 30 or equivalent. Note: Not available for first year Arts or Science. This course is designed as a prerequisite for Statistics 241.

MATH 242. *Algebra, Elementary Calculus and Probability.* ♦6 (3-1). Elementary algebraic operations. Graphs of polynomial functions. Exponents and logarithms. Permutations and combinations. The Binomial Theorem. Arithmetic and geometric progressions. Calculus of polynomial functions. Maxima and minima. Probability models, sampling. Product models. Conditional probability. Random variables. Special distributions. Multivariate distributions. Prerequisite: Mathematics 30 or its equivalent.

MATH 243. *Linear Algebra.* ♦3 (First Term, 3-0). Vector and matric operations. Linear systems of equations, dimension, axiomatic definition of vector space, constructive solution of linear equations, computation of inverses. Linear inequalities, convex sets, introduction to linear programming. Binary relations: equivalence, order, graphs. Invariants, canonical forms, eigenvalues and quadratic forms. Finite Markov chains. Prerequisite: Mathematics 30 or equivalent.

MATH 250. *Theory of Finance.* ♦6 (3-0). Application of per cent, interest, annuities certain, sinking funds and amortizations, valuations of bonds, depreciation. Life annuities and life insurance. Prerequisite: Mathematics 30.

MATH 260. *The Nature of Mathematics.* ♦6 (3-0). A survey of the history, methodology, achievements and goals of mathematics, with illustrations from elementary geometry, topology, number theory, algebra and analysis. Prerequisite: Mathematics 30. A terminal course for students not intending to proceed with Mathematics. Not an option in the Mathematics pattern.

MATH 270. *Introduction to Algebra and Geometry.* ♦6 (3-0). Structure of the number system. Mathematical induction. Binomial and multinomial theorems. Sets. Logic of simple and compound statements. Vectors and lines. Inner and cross products. The complex plane. Vector geometry. Matrix algebra. Groups and transformations. Prerequisite: Mathematics 30.

MATH 271. *Algebra and Geometry (Honors).* ♦6 (3-0). Vectors. Analytical geometry of the line and plane. Conics and quadrics. Linear transformations and matrices. Determinants. Groups of transformations. Abstract groups, rings, fields. Prerequisite: Mathematics 30 and 31 or their equivalents. Note: This course is recommended for students with at least a 75 per cent grade in Mathematics 30. Other students may be admitted with the consent of the Department.

MATH 274. *Algebra.* ♦6 (3-0). Logic and sets. Groups, rings and fields. The number system—an axiomatic treatment. Linear algebra. Prerequisite: Mathematics 30 or equivalent.

MATH 304. *Calculus and Analytical Geometry.* ♦6 (3-2). Determinants. Polar and parametric co-ordinates. Methods and applications of integration. Infinite series. Vectors and space geometry. Partial differentiation. Complex numbers. Multiple integrals. Elements of linear differential equations. Prerequisite: Mathematics 201 or 220, or equivalents.

MATH 306. *Advanced Calculus.* ♦6 (5-0). Sequences and series, differential calculus of scalar fields, linear differential equations, multiple integrals. Line integrals. Theorems of Gauss, Green, and Stokes. Prerequisite: Mathematics 206 or consent of the Department. Prerequisite or corequisite: Mathematics 271. Note: This course is required for second year Honors students in Mathematics and Physics. Other students admitted only with the consent of the Department.

MATH 307. *Calculus and Analytic Geometry.* ♦6 (5-0). (Arts and Education.) Polar co-ordinates. Rotation of axes. Analytical geometry of three dimensions. Partial derivatives. Multiple integrals. Sequences and series. Introductory differential equations. Prerequisite: Mathematics 207 or equivalent.

MATH 308. *Differential Equations.* ♦3 (First Term, 3-0). First-order equations. Equations with constant co-efficients. Linear equations of the second order. Systems of equations. Sturm-Liouville theorem and orthogonal expansions. Prerequisite: Mathematics 206.

MATH 309. *Mechanics.* ♦6 (3-0). Foundations. Statics and the principle of virtual work. Kinematics. Plane motion of a particle and a rigid body. Conservation laws. Harmonic oscillator. Motion in a central field. Impulsive motion. Prerequisite: Physics 240 or 244. Prerequisite or corequisite: Mathematics 306. Note: This course is primarily intended for Honors students in Mathematics. Other students admitted only with the consent of the Department.

MATH 310. *Elementary Mechanics.* ♦6 (3-0). Newton's Laws. Plane statistics. Systems of forces. Centre of mass. Friction. Principle of virtual work. Thin beams. Plane kinematics and dynamics of a particle. Projectile motion. Circular motion and simple harmonic motion. The conservation laws. Stability of equilibrium. Plane motion of a rigid body. Impulsive motion. Prerequisite: Mathematics 201 or equivalent. Corequisite: Mathematics 304 or equivalent.

MATH 320. *Statistical Treatment of Experimental Data.* ♦2 (1-0). Errors of observation, systematic and random. Frequency distributions. The mean and standard deviation. The binomial and Poisson distributions. The Gaussian law of error. Two-variable problems—regression and correlation. Fitting of curves by least squares. Relation between sample and population. Confidence limits. Significance of experimental results. Prerequisite: Mathematics 306. Note: This is a required course in the Honors Physics program. It will be admissible in other programs only as an extra.

MATH 324. *Introductory Linear Algebra.* ♦6 (3-0). Vector spaces. Matrices. Linear and bilinear maps. Inner product spaces. Triangulation. Polynomials. Multilinear products. Groups and rings. Prerequisite: Mathematics 270 or 271 or consent of the Department.

MATH 325. *Linear Algebra.* ♦6 (3-0). Systems of linear equations. Linear transformations and matrices. Algebra of matrices. Determinants. Abstract vector spaces. Transformations of co-ordinates. Characteristic values, similarity, diagonalization. Orthogonalization. Canonical forms for matrices. Quadratic forms. Quadric surfaces. Inner products. Prerequisite: Mathematics 271 or consent of the Department. Note: This course is primarily intended for Honors students. Other students admitted only with the consent of the Department.

MATH 326. *Linear Algebra.* ♦3 (First Term, 3-0). Systems of linear equations. Linear transformations and matrices. Algebra of matrices. Determinants. Abstract vector spaces. Transformation of co-ordinates. Characteristic values, similarity, diagonalization. Prerequisite: Mathematics 271 or consent of the Department. Note: This course is the first half of Mathematics 325 above. It is primarily intended for Honors students. Other students admitted only with the consent of the Department.

MATH 340. *Calculus and Numerical Analysis.* ♦3 (Second Term, 3-0). Calculus of rational, logarithmic and exponential functions. Functions of several variables. Partial derivatives and extreme values. Linear difference equations with constant coefficients. Interpolation procedures. Systems of linear equations. Numerical integration. Numerical solutions of equations. Prerequisite: Mathematics 240 or 242 or equivalent.

MATH 360. *Geometry.* ♦6 (3-0). Various concepts of space (Euclidean, affine, projective, and non-Euclidean), axiomatic treatment and models, relation to group theory. An introduction to point set topology (open and closed sets, Hausdorff and metric spaces). Prerequisite or corequisite: Mathematics 304 or 306 or consent of the Department.

MATH 374. *Geometry.* ♦6 (3-0). Euclidean geometry. Projective and other non-Euclidean geometries. Prerequisite: Mathematics 274 or consent of the Department.

MATH 404. *Advanced Calculus.* ♦6 (3-0). Vector analysis. Ordinary differential equations. Series solutions of differential equations. Gamma, Bessel and Legendre functions. Fourier series. Boundary value problems. Prerequisite: Mathematics 304 or its equivalent. Note: Course available to Honors Chemistry students and to students in the Mathematics and Physics pattern.

MATH 410. *An Introduction to Set Theory and Elementary Topology.* ♦6 (3-0). The algebra of sets, relations, cardinal arithmetic, the axiom of choice, real numbers, topology of metric spaces. Emphasis on presenting topics with a view to applications. Prerequisite: Mathematics 306 or consent of the Department.

MATH 421. *Boundary Value Problems.* ♦6 (3-0). Partial differential equations of mathematical physics, Bernoulli's separation of variables, series solutions, existence and uniqueness theorems, Sturm-Liouville systems, eigenvalues and eigenfunctions, classical orthogonal functions, Fourier series and integrals. Prerequisite: Mathematics 306 or consent of the Department. Note: For honors students in Mathematics and Physics.

MATH 423. *Differential Geometry.* ♦6 (3-0). Theory of surfaces. Quadratic differential forms. Geodesics and curvature. Riemannian manifolds. Exterior differential forms. Prerequisite: Mathematics 306 and 308, or equivalents.

MATH 424. *Algebra and Number Theory.* ♦6 (3-0). Fundamental Theorem of Arithmetic. Continued fractions. Linear congruences. Elementary theory of arithmetic functions. Sum of squares. Quadratic reciprocity. Groups, rings, integral domains, fields. Prerequisite: Mathematics 270 or 271 or 274. Note: This course is primarily for B.A. students. Other students admitted only with consent of the Department.

MATH 425. *Abstract Algebra I.* ♦6 (3-0). Groups, rings, fields. Polynomials, abstract vector spaces. Matrix algebra. Prerequisite: Mathematics 271 and 306.

MATH 426. *Complex Variables I.* ♦6 (3-0). Complex numbers. Functions of a complex variable, the Cauchy-Riemann equations. Power series, elementary functions. Cauchy's Theorem. Calculus of residues, Laurent series. Meromorphic functions, Weierstrass and Mittag-Loeffler representation theorems. Elementary conformal mapping. Introduction to analytic continuation. Prerequisite: Mathematics 306 or 404 or 415. Note: For honors students in Mathematics and Physics.

MATH 430. *Advanced Mechanics.* ♦6 (3-0). Review of Newton's Laws. Lagrange's equations derived from Newton's Laws and D'Alembert's principle. The central force problem. Motion of a rigid body. Tops and gyroscopes. Variational principles. Hamilton's equations. Canonical transformations. Hamilton-Jacobi equation. Prerequisite: Mathematics 309 or Physics 370 or consent of the Department.

MATH 440. *Real Variables I.* ♦6 (3-0). Sequences and series of constants and functions, double series, infinite products, Cesaro and Abel Summability, uniform convergence. Metric spaces; limits, continuity, connectedness, compactness. Weierstrass, Picard, and Arzela theorems. Introduction to the Lebesgue integral on the line. Fourier series and integrals. Prerequisite: Mathematics 306 or consent of the Department.

MATH 500. *Theory of Functions of a Complex Variable.* ♦6 (3-0). Complex numbers. Complex series. Functions of a complex variable. Cauchy's theorem and the calculus of residues. Integral functions. Conformal representation. The Laplace

and Fourier transforms. Prerequisite: Mathematics 404 or 415 or equivalents. Note: Only one of Mathematics 500 and 501 may be taken for credit towards a degree. Mathematics 500 is not open to graduate students in Mathematics.

MATH 501. *Theory of Functions of a Complex Variable.* ♦6 (3-0). The complex number system. Complex-valued functions. Convergence of series. Complex integration. Representation theorems. Calculus of residues. Prerequisite: Mathematics 440 and 426 or consent of the Department. Note: Only one of Mathematics 500 and 501 may be taken for credit towards a degree.

MATH 502. *History of Mathematics.* ♦6 (3-0). The Alexandrian School and the foundations of geometry. Saccheri and the beginnings of modern geometry. The renaissance of algebra in Europe, the Arabic heritage. Cartesian, metric and projective geometries. Development of calculus and mechanics. Logical foundations of mathematics. Prerequisite: Mathematics 306 and 360 or consent of the Department. Note: For B.A. Honors students in Mathematics.

MATH 505. *Foundations of Analysis.* ♦6 (3-0). The development of the number system from the natural numbers to the complex numbers. Proofs and definitions by induction. General sums and products. Decimal expansion of a real number. Finite, countable, and uncountable sets. Cardinal numbers. Well-ordered sets, ordinal numbers. Prerequisite: Mathematics 425.

MATH 510. *Abstract Algebra II.* ♦6 (3-0). Peano's axioms and their development. Structure theory of groups and rings. Galois theory. Valuation theory of fields. Lattice theory and Boolean algebras. Prerequisite: Mathematics 425.

MATH 515. *Number Theory.* ♦6 (3-0). Divisibility; congruences, primitive roots; quadratic reciprocity. Number-theoretic functions and the distribution of primes. Diophantine problems. Rational approximations to real numbers.

MATH 516. *Introduction to Functional Analysis.* ♦6 (3-0). Metric spaces: contraction mappings, Baire's theorem, equicontinuity, Ascoli's theorem. Banach spaces: linear functionals, dual space, Hahn-Banach theorem; uniform boundedness principle, open mapping theorem, closed graph theorem; weak and weak* topology; representation of linear functionals in special spaces; selected examples. Hilbert spaces: orthogonality, orthonormal sets, Bessel's inequality, Parseval's formula; compact symmetric operators. Additional topics at the discretion of the instructor. Prerequisites: Mathematics 440 and 410, or consent of the Department.

MATH 520. *Differential Geometry.* ♦6 (3-0). Survey of classical differential geometry. Curvature of curves and surfaces. Synthetic differential geometry. Axiomatic treatment of topological and general metric spaces. Applications to non-Euclidean, Riemannian, Finsler, and Busemann spaces.

MATH 522. *Partial Differential Equations.* ♦6 (3-0). First Order equations. Classification of higher order equations. Integral transform method of solutions. Elements of potential theory. The wave equation in 1, 2, and 3 space dimensions. The heat equation. Integral equations including the Fredhalm Theory and the Hilbert-Schmidt theory. Applications of integral equations to boundary value and eigenvalue problems. Prerequisite: Mathematics 421 or consent of the Department.

MATH 530. *Theory of Approximation.* ♦6 (3-0). Polynomial interpolation and the general remainder theorem. Weierstrass theorem and best approximation. Approximation in $L^2$ and $L^1$ norm. Muntz theorem. Degree of approximation by trigonometric polynomials. Degree of rational approximation. Approximation by linear polynomial operators. Prerequisite: Mathematics 426 and Mathematics 440 or consent of the Department.

MATH 541. *Real Variables II.* ♦6 (3-0). Prerequisite: Mathematics 440 or consent of the Department.

MATH 550. *Generalized Dynamics and Special Relativity Theory.* ♦6 (3-0).

MATH 554. *Theory of Elasticity.* ♦6 (3-0). Stress, strain, stress-strain relations. Stretching, bending, torsion, and flexure of cylinders. Two-dimensional problems with an introduction to the work of Muskelvili. Introduction to three-dimensional problems. Variational methods. Prerequisite: Mathematics 408 or 426 or 500 or consent of the Department.

MATH 555. *Hydro-, and Aero-dynamics.* ♦6 (3-0). Classical hydrodynamics. Kutta-Joukowski theory of airfoils. Boundary layers. Flow of a viscous fluid. Supersonic flow. Shock waves.

MATH 580. *Tensor Analysis.* ♦6 (3-0). Algebra of tensors. Covariant differentiation. Applications of tensorial methods to the geometry of curves and surfaces, analytical dynamics, elasticity, the special and general theories of relativity, and cosmology.

MATH 600. *Analysis. Special Functions.* ♦6 (3-0).

MATH 604. *Measure Theory.* ♦6 (3-0).

MATH 605. *Mathematical Logic.* ♦4 (2-0).

MATH 610. *Calculus of Finite Differences.* ♦6 (3-0).

MATH 615. *Integral Equations.* ♦6 (3-0).

MATH 616. *Topics in Functional Analysis.* ♦6 (3-0).

MATH 620. *Advanced Complex Analysis.* ♦6 (3-0).

MATH 621. *Ordinary Differential Equations (Advanced).* ♦6 (3-0).

MATH 624. *Combinatorial Analysis.* ♦6 (3-0).

MATH 625. *Analytic Number Theory.* ♦6 (3-0).

MATH 630. *General Topology.* ♦6 (3-0).

MATH 631. *Algebraic Topology.* ♦6 (3-0).

MATH 645. *Lattice Theory.* ♦6 (3-0).

MATH 650. *Elementary Seminar.* ♦4 (2-0).

MATH 670. *Topics in Algebra.* ♦6 (3-0).

MATH 671. *Topics in Analysis.* ♦6 (3-0).

MATH 672. *Topics in Geometry.* ♦6 (3-0).

MATH 673. *Topics in Applied Mathematics.* ♦6 (3-0).

MATH 675. *Topics in Differential Equations.* ♦6 (3-0).

MATH 691. *Group Theory.* ♦6 (3-0).

MATH 695. *Advanced Relativity Theory.* ♦6 (3-0).

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## 184.14 / *Meteorology*

Department of Geography

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MET 307. *General Meteorology.* ♦6 (3-3). A systematic study of weather elements and atmospheric processes, with emphasis on the underlying physical principles. Atmospheric composition, temperature, humidity, wind stability, cloud forms, precipitation processes, fronts and air masses, and an introduction to the general circulation. The lectures will be supplemented by practical work in weather observing and elementary weather map analysis. Prerequisites: Geography 201, or a first course in calculus, or consent of the Department. Note: A student cannot receive credit for both Geography 303 and Meteorology 307. Science students are advised to take Meteorology 307.

MET 405. *Introduction to Theoretical Meteorology.* ♦6 (3-3). The physics of the atmosphere, including thermodynamics of dry and moist air, stability, solar and terrestrial radiation, equation of motion, friction, vorticity, and an introduction to turbulent processes. Prerequisite: Physics 240 or

equivalent. Prerequisite or corequisite: Mathematics 304 or equivalent.

MET 505. *Reading and Seminar Course in Meteorology.* ♦6.

MET 511. *Synoptic Meteorology.* ♦6 (3-3). Structure of the atmosphere. The structure and behavior of weather systems. Planetary scale motion systems. Jet streams. Vertical motion. Condensation phenomena. Meso-scale phenomena.

MET 512. *Synoptic Meteorology Laboratory.* ♦4 (0-4-0). Complementary to Meteorology 511. Analysis of surface and upper air charts, and cross sections. Forecasting methods. Prognosis by graphical and computer methods.

MET 513. *Physical Meteorology.* ♦4 (2-2). Atmospheric radiation. Solar and terrestrial radiation. Radiation calculation. Physics of clouds and precipitation. Radar meteorology. Atmospheric electricity. The stratosphere and higher layers of the atmosphere.

MET 515. *Meteorological Statistics.* ♦3 (Second Term, 3-3). Application of Statistics to Meteorology. Fourier analysis of time series. Power spectrum analysis and stochastic processes.

MET 525. *Advanced Topics in Dynamic Meteorology.* ♦6 (3-3). Elements of numerical weather prediction. Atmospheric turbulence and diffusion. Atmospheric energy and energy transformation. Mathematical models.

MET 555. *Research in Meteorology.* ♦6.

## 184.15 / *Microbiology*

MICRB 360. *General Microbiology.* ♦6 (3-3). Properties and activities of bacteria, fungi and viruses, leading to an interpretation of the mechanisms of sterilization, pathogenicity and immunity, chemotherapy and industrial processes. Laboratory exercises in basic microbiological techniques and their practical applications. Prerequisites: Chemistry 230 and Chemistry 250 or 350, which may be taken concurrently; Biology 230 or 130.

MICRB 401. *Immunology.* ♦3 (3-0). Basic mechanisms underlying immunity and immunological unresponsiveness interpreted on the cellular and subcellular levels. Prerequisites: Microbiology 360 (or equivalent) and a University course in Biochemistry, or consent of the Department. (Not given, 1968-69.)

MICRB 403. *Microbial Taxonomy.* ♦3 (either term, 3-0). The history, principles, and methods of microbial classification and nomenclature. Prerequisite: Microbiology 360.

MICRB 405. *Immunology Laboratory.* ♦3 (0-3). Laboratory exercises to demonstrate quantitation of the immune response and the isolation and characterization of antigens. Prerequisite or corequisite: Microbiology 401. (Not given, 1968-69.)

MICRB 406. *Seminar.* ♦6 (3-0). Note: Senior Honors students only.

MICRB 412. *Microbial Physiology.* ♦3 (First Term, 3-3). The structure, growth and metabolic pathways used by bacteria, yeasts and moulds. Emphasis is placed on the comparative biochemical aspects of microbial life. Laboratory exercises introduce the techniques used for measuring microbial growth and for following metabolic events at the whole cell level. Prerequisites: Microbiology 360, Biochemistry 300 or consent of the Department.

MICRB 414. *Molecular Biology of Bacterial Viruses.* ♦3 (First Term, 3-3). The structure and replication of bacterial viruses. Prerequisites: Biochemistry 300 or equivalent. Recommended: Microbiology 360 and Genetics 351.

MICRB 422. *Microbial Metabolic Pathways.* ♦3 (Second Term, 3-3). The biochemical pathways and reactions peculiar to groups of microorganisms, including use of diverse sources of carbon and energy, photosynthesis and autotrophy. Prerequisites: Microbiology 412, Microbiology 360, Biochemistry 300, or consent of the Department.

MICRB 424. *Animal Virology.* ♦3 (Second Term, 3-3). The characterization, classification, and replication of animal viruses, together with experimental approaches to the use of various tissue culture systems in virology. Prerequisites: An introductory course in Microbiology or Bacteriology; Biochemistry 300 or equivalent which may be taken concurrently; Microbiology 414 is recommended.

NOTE: Credit may be given in appropriate cases for courses in Microbiology other than those listed above, e.g.: Dairy and Food 465, 466; Soils 430; Botany 341, 342; Bacteriology 421.

MICRB 503. *Research.* ♦6 (0-6).

MICRB 505. *Intermediary Metabolism.* ♦3 (First Term, 3-0).

MICRB 506. *Cellular Control Mechanisms.* ♦3 (Second Term, 0-6).

MICRB 507. *Graduate Seminar.* ♦6 (3-0).

MICRB 508. *Recent Developments in Virology.* ♦3 (3-0).

MICRB 510. *Structure of Microorganisms.* ♦3 (Second Term, 3-3).

MICRB 515. *Biosynthesis of Fungal Metabolites.* ♦3 (First Term, 3-0).

NOTE: Not all graduate courses are offered every year.

## 184.16 / *Paleontology*

Departments of Zoology and Geology

PALEO 518. *Paleontology of the Lower Vertebrates.* ♦3 (First Term, 3-3). The origin, classification, evolution and historical distribution of the fishes, amphibians, reptiles and birds. Prerequisite: Consent of the Department.

PALEO 519. *Paleontology of the Higher Vertebrates.* ♦3 (Second Term, 3-3). The origin, classification, evolution and historical distribution of the mammals; particular emphasis on the fossil history of the carnivores and "ungulates". Prerequisite: Consent of the Department.

PALEO 620. *Problems in Vertebrate Paleontology.* ♦3 (1-0). A seminar course dealing with specific topics of current research interest in vertebrate paleontology. Prerequisites: Paleontology 518, 519.

## 184.17 / *Pharmacology*

Department of Pharmacology, Faculty of Medicine

PMCOL 432. *General Pharmacology.* ♦6 (2-3). The pharmacological action of drugs, emphasizing basic pharmacological principles as applied to representative drugs having their primary actions on various organ systems of the body. Classes of drugs studied include anesthetics, central nervous system excitants, drugs acting on the autonomic nervous system, cardiovascular and diuretic drugs, chemotherapeutic agents and toxicology of miscellaneous substances. Prerequisites or corequisites: Biochemistry 300 and one of Physiology 361, 362, 411 or 463.

## 184.18 / *Physical Science*

PH SC 341. *Physical Science.* ♦6 (3-0). A course designed to give students in B.A. and B.Ed. programs some appreciation of fundamental ideas and methods in the physical sciences, their history and development, modern trends in these fields, and their relation to other disciplines. Illustrative material will be taken from Physics, Chemistry, Astronomy, and Geology. Note: (1) May not be used for credit towards the B.Sc. degree. (2) Not open to first year students. (3) May not be taken for credit by students who have credit in Physics 100 or 200.

## 184.19 / *Physics*

PHYS 100. *Introductory General Physics.* ♦6 (3-3). Introduction to the experimental phenomena and theoretical ideas of physics. This course may be taken as a substitute for Grade XII physics, but is given from a more advanced point of view with greater reference to current developments. This course may not be taken for credit by students who already have credit for Physics 30.

PHYS 200. *Basic General Physics.* ♦6 (3-3). The mechanical, thermal, electromagnetic and optical properties of matter; the forms and transformations of energy; introduction to the atomic theories of modern physics. (For a continuation, see Physics 300 and 400.) Prerequisites: Physics 30, Mathematics 30.

PHYS 240. *Mechanics, Wave Motion and Optics.* ♦6 (3-3). Mechanics, kinematics, dynamics, rotational motion. Work, energy, momentum. Collisions. Gravitation. Wave motion, oscillations. Geometric optics, introduction to interference and diffraction. Survey of present day Physics. Prerequisites: Physics 30, Mathematics 30 and 31. Corequisites: Mathematics 201 or 207 (students who lack Mathematics 31 must also take Mathematics 101).

PHYS 300. *Modern Physics (I).* ♦6 (3-3/2). Modern physics, emphasizing the development of current theoretical concepts and modern experimental methods. Topics will include: kinetic theory of matter; electromagnetic waves; relativity; nuclear physics, elementary particles; cosmic rays. Prerequisites: Physics 200 or 340 or 380; Mathematics 180 or 201.

PHYS 311. *Heat, Thermodynamics and Kinetic Theory.* ♦3 (Second Term, 3-0). Temperature, specific heats, phase changes. First and second laws of thermodynamics. Derivation and application of Maxwell's relations. Elementary kinetic theory.

PHYS 340. *Light, Electricity and Magnetism.* ♦6 (3-3). Designed to follow Physics 240 and to give a foundation in physics suitable for work in other physical sciences. Interference, diffraction and polarization of light. Electrostatics, potential, capacitors, D.C. circuits, magnetism and magnetic field, electromagnetism, induced E.M.F., self-inductance, introduction to alternating currents. Elementary atomic and nuclear physics. Prerequisites: Physics 240, Mathematics 180 or 201 or 207.

PHYS 342. *Contemporary Physics.* ♦6 (3-0). A largely non-mathematical course designed to acquaint non-science students with ideas and background behind current scientific and technical developments. Topics discussed will include atomic structure, nuclear fission and fusion; lasers; computers; space research. Desirable background at least Science 20. Note: Not available for credit to students in the Faculty of Science.

PHYS 343. *Mechanics.* ♦3 (First Term, 3-0). Particle dynamics. Central forces, planetary motion. Rutherford scattering. Potential theory. Harmonic oscillators, damped and forced oscillators. Rigid body motion. Electricity. Wave motion, vibrating strings, normal modes. Fluid statics and dynamics. Prerequisites: Physics 240 and Mathematics 201 and 207.

PHYS 351. *Relativity.* ♦2 (Second Term, 2-0). Postulates of relativity, proper and improper time. Length, velocity, acceleration. Four vectors. Lorentz transformations. Energy and momentum. Centre of mass. Zero mass particles. Electric and magnetic fields. Forces. Prerequisite: Physics 240.

PHYS 371. *Introductory Atomic and Nuclear Physics.* ♦3 (Second Term, 3-0). Thermal radiation and the quantum theory, Planck's radiation law. Photoelectric and Compton effects. Bohr atom. Quantum mechanics, Schrödinger equation, solutions for simple systems, periodic table. X-rays. Elementary solid state physics. Elementary particles. Prerequisite: Physics 240. Corequisite: Physics 381.

PHYS 381. *Electricity and Magnetism.* ♦3 (First Term, 3-0). Electrostatics, fields, potential theory, d.c. circuits. Dielectrics, capacitance. Magnetic fields, magnetization, inductance. Instruments. R-L-C circuits. Maxwell equations. Prerequisites: Physics 240 and Mathematics 206. Corequisite: Mathematics 306.

PHYS 390. *Physics Laboratory.* ♦3 (First Term, 0-3; Second Term, 0-6). A general physics laboratory, "open lab" system. Analysis of results of some experiments to be by both computer and slide rule for comparison. Prerequisites: Physics 240.

PHYS 400. *Modern Physics (II).* ♦6 (3-3/2). A complement to Physics 300. Review of wave motion and particle motion; concepts of quantum theory; applications to atomic structure and the solid state; modern spectroscopy. Prerequisites: Physics 200 or 340 or 380; Mathematics 180 or 201.

PHYS 416. *Introduction to Wave Mechanics and Theory of Solids.* ♦4 (2-0). The Schrödinger equation, quantum statistics, binding forces, electron theory of solids, properties of metals and semi-conductors. Prerequisites: Physics 330 or Physics 380, Mathematics 303 or Mathematics 306.

PHYS 420. *Introduction to Earth Physics.* ♦6 (3-3). Physical methods of studying the solid earth. Elastic waves and gravitation. Physical properties of the earth as indicated by earthquake waves, gravity, paleomagnetic and magnetic and electrical measurements. Principles of geophysical exploration methods. Heat flow in the earth's crust, radio-activity of rocks. Prerequisite: Physics 340.

PHYS 440. *Electronics.* ♦6 (3-3). Theory and use of electron tubes and solid state devices, including four-terminal active and passive networks; equivalent circuits, resonant and coupled circuits; filters; amplifiers and oscillators; non-linear circuits; digital and analog circuits. Prerequisites: Physics 340 or 380, Mathematics 304 or 306.

PHYS 468. *Advanced Laboratory.* ♦3 (0-3). Methods in experimental atomic physics and spectroscopy. Corequisite: Physics 474.

PHYS 474. *Relativity and Introduction to Wave Mechanics.* ♦4 (2-0). Special relativity, wave mechanics; introduction to Schrödinger equation; solutions for plane waves, hydrogen-like atom; vector model of the atom. Prerequisite: Physics 380. Prerequisite or corequisite: Mathematics 404 or 421.

PHYS 480. *Electromagnetism.* ♦6 (3-3). Potential theory; description of electromagnetic field using vector methods; Maxwell's equations; electromagnetic waves in continuous media and in guides; selective topics in electromagnetism. Prerequisite: Physics 340 or 380. Prerequisite or corequisite: Mathematics 404 or 421.

PHYS 510. *Statistical Physics.* ♦6 (3-0). The statistical basis of thermodynamics. Topics include irreversible processes, Boltzmann, Fermi-Dirac, and Bose-Einstein statistics, phase equilibria, transport phenomena, chemical reactions and fluctuations. Prerequisites: Physics 350, Mathematics 404, or 421.

PHYS 516. *Introductory Solid State Physics.* ♦4 (2-0). The theory of solids, including a study of the properties of metals, semi-conductors and dielectrics. Prerequisite: Physics 474.

PHYS 520. *Geophysics.* ♦6 (3-0). Seismology and physics of the earth's interior, gravity; heat flow; tectonophysics; geomagnetic, paleomagnetic and electromagnetic methods in the study of the earth. Special techniques such as deconvolution and power spectrum estimation.

PHYS 528. *Applied Laboratory Geophysics.* ♦4 (1-3). Methods in experimental geophysics: exploration reflection and refraction seismology; analysis of earthquake data; synthetic seismograms; gravity and magnetic interpretation; electromagnetic and electrical methods of studying the earth; susceptibility and conductivity of rocks.

PHYS 550. *Mathematical Physics.* ♦6 (2-1s). An introduction to the principal mathematical methods of dealing with the scalar and vector fields of Physics. Topics include the Sturm-Liouville theory of eigenvalue problems, matrices, partial differential equations, operational methods and Laplace transforms, Fourier transforms, Green's functions, integral equations and the nonlinear equations of hydrodynamics. One hour per week will be spent on class discussion of problems. Prerequisite: Physics 480, Mathematics 404 or 421.

PHYS 560. *Optics and Spectroscopy.* ♦6 (3-0). Advanced discussion of such properties of electromagnetic radiation as interference, diffraction, polarization and absorption; also interactions of electromagnetic radiation leading to the quantum theory of radiation and a study of radiation emission by atoms and molecules. The current applications of optical spectroscopy will be examined. Prerequisites: Physics 370 and 480, Mathematics 404 or 421.

PHYS 568. *Advanced Laboratory.* ♦6 (0-7). Methods in experimental atomic physics, spectroscopy and nuclear physics, introduction to modern laboratory techniques. The hours required and the experiments assigned depend upon the student's complete fourth year program. Prerequisites: Physics 474 and Physics 440 or equivalent. Note: Restricted to honors Science students.

PHYS 570. *Quantum Mechanics.* ♦6 (3-0). Application of quantum mechanics to elementary scattering theory. Perturbation methods. Semi-classical theory of radiation. Identical particles and spin. Prerequisites: Physics 480 and 474, Mathematics 404 or 421.

PHYS 572. *Nuclear Physics.* ♦4 (2-0). Introductory survey of modern experimental and theoretical nuclear physics. Prerequisite: Physics 474.

PHYS 574. *Radiation Physics.* ♦6 (3-0). X-rays and radioactivity, with emphasis on their biological effects and medical uses. Production, properties and uses of radioactive isotopes. Prerequisite: Physics 474 or approval of the Department.

PHYS 576. *Reactor Physics.* ♦3 (Second Term, 3-0). Slowing of neutrons, neutron diffusion theory, the pile equations, critical dimensions for simple pile shapes, the neutron cycle, reactor control, health physics. Corequisite: Physics 572.

PHYS 601. *Seminars in Advanced Topics.* Weekly research seminars are held in Theoretical Physics, Nuclear Physics and Low Temperature Physics.

PHYS 611. *Semiconductors.* ♦3 (either term, 3-0).

PHYS 613. *Low Temperature Physics.* ♦3 (either term, 3-0).

PHYS 615. *Lattice Defects in Solids.* ♦3 (either term, 3-0).

PHYS 617. *Transport Properties in Metals.* ♦3 (either term, 3-0).

PHYS 621. *Geomagnetism.* ♦3 (First Term, 3-0).

PHYS 623. *Time Sequence Analysis.* ♦3 (First Term, 3-0).

PHYS 624. *Theoretical Seismology.* ♦3 (Second Term, 3-0).

PHYS 626. *Stable and Radioactive Isotope Studies.* ♦3 (First Term, 3-0).

PHYS 627. *Electromagnetic Boundary Value Problems in Geophysics.* ♦3 (First Term, 3-0).

PHYS 628. *Topics in Solar-Terrestrial Relationships.* ♦3 (Second Term, 3-0).

PHYS 629. *Paleomagnetism.* ♦3 (Second Term, 3-0).

PHYS 660. *Atomic Theory and Spectroscopy.* ♦4 (2-0).

PHYS 662. *Molecular Spectroscopy.* ♦6 (3-0).

PHYS 672. *Advanced Nuclear Physics.* ♦6 (3-0).

PHYS 674. *Experimental Topics in Nuclear Physics.* ♦6 (3-0).

PHYS 680. *Advanced Quantum Mechanics.* ♦6 (3-0).

PHYS 682. *Advanced Electromagnetic Theory.* ♦6 (3-0).

PHYS 685. *Advanced Statistical Mechanics.* ♦6 (3-0).

PHYS 686. *Critical Phenomena.* ♦3 (First Term, 3-0).

PHYS 688. *Solid State Theory.* ♦6 (3-0).

PHYS 690. *Quantum Field Theory.* ♦6 (3-0).

PHYS 691. *Elementary Particle Physics.* ♦6 (3-0).

PHYS 692. *Group Theory and Applications.* ♦6 (3-0).

PHYS 697. *Nuclear Structure.* ♦6 (3-0).

PHYS 698. *Modern Mathematical Concepts in Contemporary Physics.* ♦4 (2-0).

PHYS 699. *Selected Topics in Theoretical Physics.* ♦4 (2-0).

PHYS 788. *Advanced Topics in Solid State Theory.* ♦6 (3-0).

## 184.20 / *Physiology*

PHYSL 361. *Elementary Physiology.* ♦6 (3-3). The essentials of mammalian physiology. Laboratory experiments illustrating the lecture material. Prerequisites: Biology 130 or 230 or Zoology 220 or 225, Chemistry 250 or 350, and Physics 200 or 340 are recommended. Note: Designed for students in Arts and Science, Household Economics, and Pharmacy. Open to other students with consent of the Department.

PHYSL 401. *Special Mammalian Physiology.* ♦3 (Second Term, 3-3). Selected topics in mammalian physiology. The laboratory exercises will provide experience in more advanced physiological methods. Prerequisites: Physics 200; Physiology 361 or Zoology 440. Alternative qualification may be accepted with consent of the Department.

PHYSL 410. ♦6 (3-0). The same lecture course as Medical Physiology 411 without the laboratory. Available to Graduate Students in Biochemistry and Pharmacology by special arrangement.

PHYSL 463. ♦6 (3-0). The same lecture course as Medical Physiology 411 without the laboratory. The student begins the course approximately two weeks after it has started in the Medical Faculty. Open to selected students after consultation with the Department. Prerequisites: Biology 230 or Zoology 220; Chemistry 370 or Zoology 300; Physics 200 or equivalent.

PHYSL 502. *Problems in Current Research.* ♦3 (0-3). Students will be assigned according to their interests, to one or more members of staff during the year. They will become familiar with the particular research programs, the techniques, and relevant literature. A critical written report of each program and its historical background will be submitted by the students.

PHYSL 503. *Topics in Biophysics.* ♦3 (Second Term, 3-0). Several topics will be selected from the following fields: membrane theory, nerve conduction, synaptic transmission, modern concepts of muscle, information theory, special senses, radiation biology, control theory in living systems. Emphasis on the mathematical and physical approach with reference to the current literature. Prerequisites: This course is designed for students proceeding towards a research career in Physiology and related disciplines. Students must have an appropriate background in Physiology and related subjects acceptable to the Department.

PHYSL 504. *The Physiology of the Adrenal Cortex and the Gonads.* ♦3 (either term, 3-0). A review of the physiology of the vertebrate adrenal cortex including its relationship to the pituitary, a brief consideration of diseases of this gland in man, and of the estimation of its hormones in blood and urine. An introductory review of the physiology of reproduction in mammals and birds followed by detailed consideration of selected problems in endocrine physiology such as functions and control of secretion of prolactin, hormonal control of plumage in birds. Prerequisites: Physiology 361 or 411 or 463 or Zoology 440; Biochemistry 300 desirable as a prerequisite or corequisite.

PHYSL 506. *Tutorial and Seminar Course.* ♦3 (either term, 3-0). Seminars, tutorials and guided reading in selected topics. Training in analysis, synthesis and communication of scientific information as well as acquisition of more advanced knowledge. Prerequisites: Physiology 361, 411 (Medical) or 463; at least one of Physiology 501, 502, 593, 504 or equivalent.

PHYSL 507. *The Physiology of Temperature Regulation.* ♦3 (Second Term, 3-0). Various aspects of thermal regulation in man and other homeotherms. The neural and hormonal mechanisms contributing to the adjustments required to maintain body temperature with variation in environmental demand. Discussion of researches on which accepted physiological concepts have been used. Consideration of the mechanisms of acclimatization of such animals to low temperature.

PHYSL 509. *Advanced Respiratory Physiology.* ♦3 (either term, 3-0). Fundamental aspects of respiratory physiology with concentration on mechanics of ventilation and gas exchange, and on regulation of respiration. Prerequisites: An elementary course in physiology plus consent of the instructor. Students should have some knowledge of elementary mathematics and physics.

PHYSL 600. *Seminar.* ♦3 (1-0). Lectures on current research in various fields of Physiology and related disciplines; given by staff and visiting scientists. There is no formal credit for this course except for honors and graduate students in Physiology who are required to register and attend during one of their years in the Department.

## 184.21 / *Plant Physiology and Biochemistry*

Departments of Botany and Plant Science

PL PH 431. *Plant Biochemistry.* ♦3 (First Term, 3-3). An introduction to biochemistry, with consideration of the comparative aspects of biochemistry. Topics include intracellular structure, acidity and colloidal properties of protoplasm, chemistry and metabolism of carboyhydrates, including respiration and photosynthesis. Prerequisites: Chemistry 230 and Chemistry 250 or 350, or consent of the Department.

PL PH 432. *Plant Biochemistry.* ♦3 (Second Term, 3-3). A continuation of Plant Biochemistry 431, this course deals with the biochemistry of lipids and related constituents, and the chemistry and metabolism of nitrogen-containing compounds. Prerequisite: Plant Biochemistry 431.

PL PH 551. *Advanced Plant Biochemistry.* ♦3 (either term, 3-0). Selected topics in plant metabolism, with emphasis on the comparative biochemistry of respiration and carbon assimilation. Evaluation of recent research and methods of investigation in these fields. Prerequisites: Biochemistry 300 or 372 or equivalent or Plant Physiology and Biochemistry 431 and 432 or consent of the Departments.

## 184.22 / *Psychology*

PSYCO 301. *Honors Seminar.* ♦6 (3-1). Note: Required of all students enrolled in Honors, during their second year.

PSYCO 309. *Statistical Methods for Psychological Research.* ♦3 (either term, 3-3). Application of statistical methods to psychological problems; description of psychological data in terms of averages, measures of variability, and measures of relationships; problems of sampling theory and tests of statistical hypotheses.

PSYCO 352. *Behaviour in Relation to Genetics.* ♦3 (Second Term, 3-0). Prerequisite: Genetics 361, Psychology 360 or Psychology 309.

PSYCO 360. *General Experimental Psychology.* ♦3 (either term, 3-3). A course designed for the Arts concentration covering the application of experimental methods to a wide variety of psychological problems. Prerequisite: Psychology 202.

PSYCO 365. *Experimental Psychology.* ♦3 (either term, 3-3). Learning. Prerequisite: Psychology 202. Corequisite: Psychology 309 or consent of the Department.

PSYCO 366. *Experimental Psychology.* ♦3 (either term, 3-3). Perception. Prerequisite: Psychoolgy 202. Corequisite: Psychology 309 or consent of the Department.

PSYCO 401. *Honors Seminar.* ♦6 (3-1). Note: Required of all students enrolled in Honors, during the third year.

PSYCO 433. *Test Theory.* ♦3 (either term, 3-0). Principles of diagnosis and prediction, and the assessment of tests. Emphasis upon the concepts of "validity" and "reliability" with lesser treatment of multiple regression and factor analysis. Prerequisite: Psychology 309 or consent of the Department.

PSYCO 460. *Experimental Psychology.* ♦3 (either term, 0-3). Apparatus techniques.

PSYCO 464. *Human Performance.* ♦3 (First Term, 2-2). Introduction to the current issues, experimentation, problems, and literature relating to human performance. Special emphasis on man as an information processor. Prerequisite: Psychology 202.

PSYCO 468. *Motivation.* ♦3 (either term, 3-0). Prerequisite: Psychology 202 and 309.

PSYCO 474. *Comparative Psychology.* ♦3 (Second Term, 3-2). Principles of animal behavior with reference to phylogenetic differences. Prerequisite: Psychology 202.

PSYCO 475. *Biological Bases of Behavior.* ♦3 (First Term, 3-3). Basic neurophysiology; sensory systems. Prerequisite: Biology 130 and Psychology 202.

PSYCO 476. *Physiological Psychology.* ♦3 (Second Term, 3-3). Motor activity, motivation, and learning. Prerequisites: Psychology 475 or consent of the Department.

PSYCO 501. *Honors Seminar.* ♦6 (3-0). Note: Required of all students enrolled in Honors during their fourth year.

PSYCO 504. *Conference Course in Psychology.* ♦3 (First Term, 3-3).

PSYCO 505. *Conference Course in Psychology.* ♦3 (Second Term, 3-3).

PSYCO 528. *Advanced Psychometric Theory.* ♦6 (3-1). Psychophysics, unfolding theory, comparative judgment models. Prerequisite: Psychology 309 or consent of the Department.

PSYCO 530. *Experimental Design.* ♦6 (3-0). Note: Required of all graduate students in Psychology.

PSYCO 532. *Principles of Research.* ♦3 (First Term, 3-0). The aims of science. Clarification of methodological concepts. Operational definition. Research strategies. Types and purposes of experimental "control". The course's intent is to bridge the gulf between the theory and practice of research, i.e. how to do it and why.

PSYCO 533. *Theory of Data Analysis.* ♦3 (Second Term, 3-0). Data-processing methods in psychology, including scaling and measurement, formal character of data configurations, detection, and interpretation of data patterns, and the role of "models" in data analysis.

PSYCO 534. *Multivariate Methods.* ♦6 (3-0).

CMPUT 550. *Artificial Intelligence.* ♦6 (3-0). Human cognition and computer applications such as learning, decision making and pattern recognition. Open to senior and graduate students in Computing Science or the behavioral sciences (Psychology; Educational Psychology).

PSYCO 560. *Advanced Experimental Psychology.* ♦6 (3-0). First Term—learning; Second Term—perception. Note: Required of all graduate students in Psychology.

PSYCO 565. *Seminar in Learning Theory.* ♦3 (either term, 3-0). Prerequisite: Advanced standing in Psychology.

PSYCO 566. *Longitudinal Behavioral Modifications.* ♦6 (3s-0).

PSYCO 570. *Drugs and Behavior.* ♦3 (First or Second Term, 3-0). Prerequisite: Psychology 489, and Psychology 475, or a course in Neuropsychology.

PSYCO 575. *Advanced Physiological Psychology.* ♦6 (3-3). Prerequisite: Physiology 462 or consent of the Department.

PSYCO 577. *Seminar in Physiological Psychology.* ♦3 (either term, 3s-0). Prerequisite: Psychology 476 or consent of the Department.

PSYCO 578. *Experimental Psychopathology.* ♦3 (either term, 3-3). Scientific validation of psychoanalytic theory, perceptual studies of psychiatric patients, and experimental attempts to relate psychotherapy and learning theory. Prerequisite: Psychology 489 and one course in experimental psychology, or consent of the Department. Prerequisite: Psychology 366.

PSYCO 599. *Honors Thesis.* ♦6 (3-3).

PSYCO 600. *Research Seminar.* ♦2 (2s-0). Reports by students and staff on current research in the department. Note: Required each year of all graduate students in the Department of Psychology and for fourth year honors students.

PSYCO 648. *Research.* ♦3 (First Term, 3-3).

PSYCO 649. *Research.* ♦3 (Second Term, 3-3).

PSYCO 698. *Advanced Research Techniques I.* ♦6 (3L-0).

PSYCO 699. *Advanced Research Techniques II.* ♦6 (3L-0).

## 184.23 / *Soil Science*

Department of Soil Science, Faculty of Agriculture

SOILS 300. *General Soil Science.* ♦6 (3-0). Note: Not open to students in Faculty of Agriculture or pre-Veterinary Medicine.

## 184.24 / *Statistics*

Department of Mathematics

STAT 205. *Introductory Statistics.* ♦3 (either term, 3-2). Tabulation, graphical representation and reduction of data. Measures of location and dispersion. Elementary probability. Binomial and normal distributions. Curve fitting and the chi-square test of goodness-of-fit. Elements of sampling. Testing statistical hypotheses, confidence intervals. Prerequisite: Mathematics 30 or equivalent.

STAT 241. *Introductory Probability.* ♦3 (Second Term, 3-1). Probability models. Sampling. Product models. Conditional probability. Random variables. Special distributions. Multivariate distributions. Prerequisite: Mathematics 240 or equivalent.

STAT 255. *Elementary Statistics.* ♦6 (3-3). Graphs, tables, diagrams. Frequency distributions, averages, dispersion, moments. Elementary probability. Binomial, normal and Poisson distributions. Sampling. Regression and correlation. Significance tests. Applications to data in various fields. Prerequisite: Mathematics 30 or equivalent.

STAT 256. *Probability, Statistics, and Numerical Analysis.* ♦6 (3-0). Probability. Random variables and probability distributions. Binomial, hypergeometric, normal and Poisson distributions. Estimation, tests of hypotheses. Correlation and regression. Solution of systems of linear equations, inversion of matrices. Polynomial interpolation. Divided and ordinary differences, difference operators. Numerical integration and differentiation. Zeros of functions. Prerequisite or corequisite: Mathematics 206 and 271, or consent of the Mathematics Department.

STAT 341. *Statistical Methods.* ♦3 (First Term, 3-0). Sampling distributions. Point and interval estimations. Desirable properties of estimates. Hypothesis testing. Normal, chi-square, t- and F-tests. Types of error. Linear models: analysis of variance, regression, multiple comparison, simple design. Prerequisite: Statistics 241.

STAT 450. *Probability and Statistics.* ♦6 (3-0). Theory of probability. Distribution functions and characteristic functions. Central Limit theorem. Sampling. Exact sampling distributions. Con-

fidence intervals. Maximum likelihood. Method of least squares. Analysis of variance. Statistical inference. Prerequisites: Mathematics 304 and preferably Statistics 255 or equivalent.

STAT 455. *Introduction to Mathematical Statistics.* ♦6 (3-0). Fundamental probability set, algebra of events. Dependence and interdependence. Random variables and probability distributions. Foundations of Statistical Inference. Prerequisite: Mathematics 306 and Statistics 256. (With the consent of the Department, Statistics 256 may be waived or Mathematics 306 replaced by Mathematics 304.)

STAT 470. *Introduction to Probability.* ♦6 (3-0). Probability spaces, algebra of events. Elements of combinatorial analysis. Conditional probability, stochastic independence, discrete distributions, random variables, moments, generating functions, compound distributions, random walks, laws of large numbers, normal approximation. Introduction to Markov chains, special topics.

STAT 560. *Estimation and Statistical Hypotheses.* ♦6 (3-0). Cramér-Rao inequality; Bhattacharya bounds; sufficiency and completeness; minimax and Bayes estimates based on order statistics. Neyman-Pearson theory; similar regions; least-favorable distributions; principle of invariance; unbiased tests; non-parametric theory.

STAT 562. *Theory of Games.* ♦4 (2-0). Games in normal and extensive form. Methods of solution. Statistical games. Minimax strategies. Bayes procedures. Linear programming.

STAT 564. *Analysis of Variance.* ♦6 (3-0). Point estimation. Confidence ellipsoids and tests under normal theory. The one-way layout. Multiple comparisons: the complete two-, three-, and higher-way layouts. Partitioning of a sum of squares. Latin squares. Incomplete blocks and nested designs. The analysis of co-variance. Random effects models.

STAT 565. *Mathematical Methods of Statistics.* ♦5 (First Term, 2-0; Second Term, 3-0). Foundations. Axioms of a probability space. Dependence and independence. Random variables and probability distributions. Characteristic functions. First and second Central Limit Theorems. Exact sampling distributions. Regression and correlation. Elements of statistical inference.

STAT 570. *Probability Theory and Applications.* ♦4 (2-0). Limit theorems for random variables. Random walks and recurrent events. Applications to Markov chains and selected statistical problems.

STAT 660. *Stochastic Processes.* ♦6 (3-0).

STAT 674. *Topics in Statistics.* ♦6. Prerequisite: Consent of the Department.

## 184.25 / *Zoology*

NOTE: See also courses listed under Biology, § 184.5 above.

ZOOL 300. *The Chordates.* ♦6 (3-3). Prerequisite: Biology 230 or consent of the Department. Note: Designed for Honors students; others take Zoology 320.

ZOOL 320. *Vertebrate Biology.* ♦6 (2-4). Prerequisite: Biology 230 or consent of the Department.

ZOOL 321. *Animal Geography.* ♦3 (Second Term 3-0). The distribution of animals with ecological and geological explanations. Prerequisites: Any two of Botany 201, Geography 201, Biology 230 or consent of the Department. Note: Normally to be taken in sequence with Botany 321. Not open to Honors students in Zoology.

ZOOL 340. *Vertebrate Physiology.* ♦3 (Second Term, 3-3). Pre- or corequisites: Zoology 300 or 320; Chemistry 250 or 350; or consent of the Department.

ZOOL 350. *The Invertebrates.* ♦6 (3-3). Includes Protozoa. Prerequisite: Biology 230 or consent of the Department.

ZOOL 362. *Animal Ecology.* ♦3 (First Term, 3-3). Prerequisites: Biology 230 and a senior course in Zoology or consent of the Department.

ZOOL 405. *Ichthyology.* ♦3 (First Term, 3-3). Prerequisite: Zoology 300 or 320.

ZOOL 406. *Ornithology.* ♦3 (Second Term, 3-3). Prerequisite: Zoology 300 or 320.

ZOOL 407. *Herpetology.* ♦3 (Second Term, 3-3). Prerequisite: Zoology 300 or 320.

ZOOL 408. *Mammalogy.* ♦3 (First Term, 3-3). Prerequisite: Zoology 300 or 320 or consent of the Department.

ZOOL 411. *Embryology.* ♦3 (First Term, 3-3). Prerequisite: Zoology 300 or 320 or consent of the Department.

ZOOL 412. *Experimental Embryology.* ♦3 (Second Term, 3-3). Prerequisite: Zoology 411 or consent of the Department.

ZOOL 421. *Mechanisms of Evolution.* ♦3 (Second Term, 3-0). Prerequisites: A biology course at the 300 level. Note: It is strongly advised that Zoology 421 be preceded in the First Term by Genetics 481 or 483. (Not offered 1968-69.)

ZOOL 440. *Comparative Animal Physiology.* ♦6 (3-3). Prerequisites: Zoology 300, 350 and Chemistry 250 or 350. Zoology 350 may be taken as a corequisite with the Department's permission.

ZOOL 441. *Comparative Animal Physiology.* ♦3 (First Term, 3-3). Prerequisites: Zoology 340 and 350 or consent of the Department. Note: Designed for Honors students and others with particular interests in animal physiology. (Not offered 1968-69.)

ZOOL 448. *Comparative Endocrinology.* ♦3 (First Term, 3-3). Prerequisite: Consent of the Department. (Not offered, 1968-69.)

ZOOL 451. *Aquatic Invertebrates of Alberta.* ♦3 (Second Term, 3-3). A seminar and special projects course with emphasis on groups other than insects. Prerequisite: Zoology 350.

ZOOL 452. *Principles of Parasitism.* ♦3 (Second Term, 3-3). Host and parasite adaptations; relationships with other forms of symbiosis; effect of parasitism on the host and the parasite; parasitism and disease. Prerequisites: Zoology 350 and 362 or 462. Zoology 350 may be taken as a corequisite with the Department's permission.

ZOOL 453. *General Protozoology.* ♦3 (First Term, 3-3). Prerequisite: Zoology 350 or consent of the Department.

ZOOL 455. *Protozoan Parasites.* ♦3 (Second Term, 3-3). Prerequisite: Zoology 452 and 453 or consent of the Department. (Not offered 1968-69.)

ZOOL 464. *Limnology.* ♦3 (First Term, 3-3). Prerequisites: Zoology 300 or 320 and 350.

ZOOL 465. *Boreal Ecology.* ♦3 (Second Term, 3-3). Prerequisite: Zoology 362 or 462.

ZOOL 471. *Animal Behavior.* ♦3 (First Term, 3-1). Prerequisite or corequisite: Zoology 300 or 320, or consent of the Department.

ZOOL 481. *Practical Histology.* ♦3 (Second Term, 2-4). Principles and practice of microscopy, tissue preparation techniques, micrometry, and photomicography. Principles of biological structure. Study of tissues. Special laboratory projects for individual students. Prerequisites: Zoology 300 or 320 and 350, Chemistry 250 or 350.

ZOOL 520. *Seminar in Zoology.* ♦0 (1s). Note: Required of all fourth year honors and graduate students.

ZOOL 525. *Field Course in Zoology.* ♦0. A survey of the terrestrial and freshwater fauna of Alberta alternates yearly with a survey of the marine and littoral fauna of part of the Pacific coast. The

course lasts two weeks and follows the spring examinations. Both parts are required for the Honors B.Sc. in Zoology and should be taken in the third and fourth years.

ZOOL 529. *Special Problems in Zoology.* ♦0 (either or both terms, 3-0).

ZOOL 540. *Environmental Physiology.* ♦6 (First Term, 2-0; Second Term, 2-5). A seminar and special research project course. Prerequisites: Zoology 440, 441 or Physiology 361, or consent of the Department.

ZOOL 541. *Seminar in Environmental Physiology.* ♦6 (2-0). The lecture and seminar content of Zoology 540. Prerequisite: Zoology 440, 441 or Physiology 361, or consent of the Department.

ZOOL 542. *Seminar in Comparative Animal Physiology.* ♦6 (2-0). Prerequisites: Zoology 440, 441 or Physiology 361 or Entomology 556 or consent of the Department. (Not offered 1968-69.)

ZOOL 543. *Advanced Comparative Animal Physiology.* ♦6 (First Term, 2-0; Second Term, 2-5). The seminar content of Zoology 542, plus special research projects dealing with the comparative aspects of animal physiology. Prerequisites: Zoology 440 or Physiology 361 or Entomology 556 or consent of the Department. (Not offered 1968-69.)

ZOOL 555. *Wildlife Parasitology.* ♦3 (First Term, 3-3). Morphology, life cycles, pathology and control of animal parasites of fish, birds and mammals, with special reference to forms found in Alberta game. Prerequisite: Zoology 462 or consent of the Department. (Not offered 1968-69.)

ZOOL 556. *Helminthology.* ♦6 (1-5). Taxonomy, morphology and ecology of the parasitic helminths. Prerequisite: Zoology 452 or consent of the Department.

ZOOL 561. *Seminar in Advanced Animal Ecology.* ♦3 (Second Term, 3-0). Prerequisites: Zoology 362, 462, Botany 422 or Entomology 560.

ZOOL 562. *Conservation Topics.* ♦2 (1-0). A reading and seminar course. (Not offered 1968-69.)

ZOOL 563. *Population Ecology.* ♦3 (Second Term, 3-3). Prerequisites: Zoology 362 or 462 or Botany 422 or Entomology 560. (Not offered 1968-69).

ZOOL 564. *Stream Limnology.* ♦3 (Second Term, 3-0). Prerequisite: Zoology 464 or consent of the Department. (Not offered 1968-69.)

ZOOL 565. *Principles of Wildlife Conservation.* ♦6 3-3). Principles and concepts involved in the management of birds and mammals. Prerequisites: Zoology 406, 408 or consent of the Department.

ZOOL 571. *Advanced Animal Behavior.* ♦3 (Second Term, 3-1). Problems and recent research in animal behavior, general and comparative. Prerequisite: Zoology 471 or consent of the Department.

*Student puts together each piece of the Champosaur column, and arranges it in a bed of sand. When all the pieces are cleaned and properly set down, they will be strung on a wire.*

*Dr. R. K. Brown, Associate Dean of Graduate Studies; Dr. A. G. McCalla, Dean and Administrative Officer of Research; and Dr. Henry Kreisel, Senior Associate Dean.*

*Students and prospective students are encouraged to consult University officers about their academic plans. They should make arrangements for appointments several weeks in advance of registration deadlines.*

# *Faculty of Graduate Studies*

## 201 / INTRODUCTORY

### 201.1 / *Council of the Faculty of Graduate Studies*

WALTER HUGH JOHNS, B.A., LL.D. (Western Ontario), Ph.D. (Cornell), President of the University.

ARTHUR GILBERT McCALLA, M.Sc. (Alberta), Ph.D. (California), F.R.S.C., F.A.I.C., Professor of Plant Biochemistry and Dean of the Faculty of Graduate Studies.

HENRY KREISEL, M.A. (Toronto), Ph.D. (London), F.I.A.L., Professor of English and Associate Dean, Faculty of Graduate Studies.

ROBERT KARL BROWN, M.Sc. (Alberta), Ph.D. (McGill), Professor of Chemistry and Associate Dean of Graduate Studies.

ROBERT GEORGE BALDWIN, B.A. (British Columbia), M.A., Ph.D., (Toronto), Professor and Chairman, Department of English.

HAROLD BARCLAY, B.A. (Boston), M.A., Ph.D. (Cornell), Associate Professor and Acting Chairman, Department of Anthropology.

MILTON FRANK BAUER, B.A. (Western Ontario), M.A. (Toronto), Associate Professor and Acting Chairman, Department of Economics.

ERIC RICHARD BERG, M.A. (Texas), M.S., Ph.D. (Illinois), Professor of Agricultural Economics.

GERALD LLOYD BERRY, B.Ed., M.A. (Alberta), Ed.D. (Colorado), Professor and Head, Department of Secondary Education.

ROBERT JOHN BUCK, B.A. (Alberta), M.A. (Kentucky), Ph.D. (Cincinnati), Professor and Head, Department of Classics.

ALEXANDER DUNCAN CAIRNS, B.A. (Alberta), Registrar.

LESLIE G. CHATTEN, M.Sc. (Alberta), Ph.D. (Ohio State), Associate Professor of Pharmacy.

LAWRENCE F. L. CLEGG, B.S.A. (Toronto), Ph.D. D.Sc. (London), D.I.C., F.I.Biol., Professor and Head, Department of Food Science.

JOHN S. COLTER, B.Sc. (Alberta), Ph.D. (McGill), Professor and Head, Department of Biochemistry.

WILLIAM EASTMAN, A.B. (Oberlin), A.M., Ph.D. (Brown), Assistant Professor of Philosophy.

FREDERICK C. ENGELMANN, A.B., A.M. (U.C.L.A.), M.A., Ph.D. (Yale), Professor of Political Science.

FREDERICK ENNS, M.Ed., Ph.D. (Alberta) Professor of Educational Administration.

GEORGE FORD, M.Sc. (Alberta), Ph.D. (Stanford), Professor and Head, Department of Mechanical Engineering.

EDWARD J. HOLLINGSWORTH GREENE, M.A. (Alberta), Docteur de l'Université (Paris), Professor of French and Associate Dean of Arts.

HARRY EMMET GUNNING, M.A., Ph.D. (Toronto), Killam Memorial Professor of Chemistry and Head, Department of Chemistry.

BRIAN HOCKING, B.Sc., Ph.D. (London), M.Sc. (Alberta), A.R.C.Sc., Professor and Head, Department of Entomology.

THOMAS SYDNEY LEESON, M.A., M.D. (Cantab.) M.B., B.Chir. (London), Professor and Head, Department of Anatomy.

RUSSELL STUART MacARTHUR, M.Ed. (Alberta), Ph.D. (London), Professor of Educational Psychology.

FENTON VINCENT MacHARDY, B.E. (Saskatchewan), M.S. (Northwestern), Ph.D. (Edinburgh), Professor and Head, Department of Agricultural Engineering.

GEORGE OWEN MACKIE, M.A., D.Phil. (Oxon.), Professor of Zoology.

ROSS B. J. MACNAB, B.S. (Michigan), M.A., Ph.D. (Michigan State), Associate Professor of Physical Education.

GERALD S. MARKS, M.Sc. (Cape Town), D. Phil. (Oxon.), Associate Professor of Pharmacology.

LAIRD WARD McELROY, M.Sc. (Alberta), Ph.D. (California), F.A.I.C., Professor and Head, Department of Animal Science.

JOHN ROSS McGREGOR, B.Sc. M.Ed. (Alberta), Ph.D. (Cantab.), Professor and Head, Department of Mathematics.

LEONARD DOYAL NELSON, M.Ed. (Alberta), Ph.D. (Minnesota), Professor of Elementary Education.

THOMAS MORGAN NELSON, M.A., Ph.D. (Michigan State), Associate Professor and Associate Head, Department of Psychology.

GWYNN NETTLER, A.B. (U.C.L.A.), M.A. (Claremont), Ph.D. (Stanford), Professor of Sociology.

WILFRED EDWIN RAZZELL, B.A. (British Columbia), Ph.D. (Illinois), Professor and Head, Department of Microbiology.

ERNEST REINHOLD, B.Sc., M.A. (Alberta), Ph.D. (Michigan), Professor of German and Head, Department of Germanic Languages and General Linguistics.

DONALD BAKER ROBINSON, M.A.Sc. (British Columbia), Ph.D. (Michigan), Professor of Chemical Engineering, and Head, Department of Chemical and Petroleum Engineering.

RICHARD EDWARD ROSSALL, B.Sc., M.B., Ch.B., M.D. (Leeds), M.R.C.P., F.R.C.P.(C), Associate Professor of Medicine.

JOHN THOMAS SAMPLE, M.A., Ph.D. (British Columbia), Professor and Head, Department of Physics.

MELVILLE SCHACHTER, M.Sc., M.D. (McGill), Professor and Head, Department of Physiology.

DONALD B. SCOTT, B.A. (Toronto), Ph.D. (McGill), Professor of Physics and Head, Department of Computing Science.

STEWART RONALD SINCLAIR, M.Sc. (Alberta), Professor and Head, Department of Civil Engineering.

WILLIAM PETER SKOROPAD, M.Sc. (Alberta), Ph.D. (Wisconsin), Professor of Plant Science.

OREST STARCHUK, Lic. Jur. et Rer. Pol., Dr. Jur. et Rer. Pol. (Chernowitz), Professor of Russian and Head, Department of Slavonic Languages.
CHARLES RICHARD STELCK, M.Sc. (Alberta), Ph.D. (Stanford), Professor of Geology.
WILSON NICHOLS STEWART, B.A., Ph.D. (Wisconsin), M.A. (Illinois), Professor and Head, Department of Botany.
JOHN ALFRED TOOGOOD, B.Sc. (Alberta), Ph.D. (Minnesota), Professor and Head, Department of Soil Science.
ULRICH TRUMPENER, B.A. (Oregon), M.A., Ph.D. (California), Associate Professor of History.
BERNAL ERNEST WALKER, M.A. (Alberta), Ph.D. (Stanford), Professor and Head, Department of Educational Foundations.
GEORGE B. WALKER, M.A. (Glasgow), Ph.D. (London), Professor and Head, Department of Electrical Engineering.
JAN WEIJER, D.Sc. (Groningen), Professor of Genetics and Plant Breeding.
C. BRIAN WILLIAMS, B.Com. (British Columbia), M.B.A. (Washington), Ph.D. (Cornell), Associate Professor of Commerce.
ROBERT BARRY WISHART, B.Com. (Toronto), Administrator of Student Awards.
WILLIAM C. WONDERS, B.A., Ph.D. (Toronto), M.A. (Syracuse), Professor of Geography.
HENRY RICHARD ZIEL, B.Sc. (N.Y. State College), M.S. (Cornell), Ed.D. (Wayne State), Professor and Head, Department of Industrial and Vocational Education.

## 201.2 / *General Information*

Graduate work has been offered at The University of Alberta since its inception in 1908. During recent years the numbers of graduate students have increased rapidly, particularly in the programs leading to doctoral degrees. The present organization of the Faculty with a Dean was adopted in 1957.

The degrees offered by the Faculty are the Master of Arts, Master of Business Administration, Master of Education, Master of Engineering, Master of Fine Arts, Master of Health Services Administration, Master of Laws, Master of Music, Master of Science, Doctor of Education and Doctor of Philosophy. All except the M.Eng. are based on programs of study including a thesis project. The Doctor of Letters and Doctor of Science degrees are awarded for outstanding achievements in the humanities or sciences. In 1967 the degrees awarded included one LL.M., ninety-three M.A., four M.B.A., fifty-seven M.Ed., one hundred and thirty-one M.Sc., eighty-four Ph.D. There were 2,100 students registered in the Faculty in 1967-68 including more than 1,950 in the Winter Session.

General regulations, applicable to all graduate students, are set out in § 202, below. Special regulations, applicable to those in a particular degree program, are set out in § 203, below. Further inquiries should be directed to the Dean, Faculty of Graduate Studies.

# 202 / GENERAL REGULATIONS

## 202.1 / *Classification of Graduate Students*

Graduate students at The University of Alberta are classified in one of the following six categories:

(1) *Qualifying graduate student.* A student who holds a three year bachelor's degree from The University of Alberta, or a similar qualification from some other institution, may be admitted as a qualifying graduate student. On completing satisfactorily a qualifying year in his department, he may be reclassified as a probationary graduate student or a candidate for a master's degree.

(2) *Probationary graduate student.* Such a student is one whose academic record is either (i) difficult to assess, as in the case of some foreign students, or (ii) below the standard normally required. After the completion of one academic year, a probationary graduate student who has proved his competence to the satisfaction of his department and the Faculty may be accepted as a candidate for a master's degree or a provisional candidate for a doctor's degree. If accepted, he may apply to the Faculty to have courses completed during his probationary year credited towards the requirements for a degree. Each such application will be considered on its merits.

(3) *Candidate for a master's degree.*

(4) *Provisional candidate for a doctor's degree.* All Ph.D., combined M.D.-Ph.D., and Ed.D. students are first admitted as provisional candidates, and reclassified as candidates only when they have met certain

requirements outlined in the special regulations for the relevant degree (see § 203, below).

(5) *Candidate for a doctor's degree.*

(6) *Special graduate student.* Such a student is one who is in every respect eligible for admission to the Faculty and who, though not registered in a degree program at this University, takes one or more *graduate* courses, with the permission of the Department concerned.

## 202.2 / *Admission*

### 202.2.1 / ADMISSION REQUIREMENTS

The requirements for admission as a graduate student are:

(1) A baccalaureate degree, with a grade point average of at least 6 in the work of the last two undergraduate years at The University of Alberta; or an equivalent qualification from another institution; and

(2) A statement from the head of the department concerned to the effect that the applicant is, in all respects, acceptable to the Department. A special graduate student, however, not being a candidate for a degree, does not require departmental recommendation.

### 202.2.2 / APPLICATION FOR ADMISSION

Application for admission to the Faculty must be submitted on forms supplied by the Dean. No assurance can be given that applications received after August 15 (for the Winter Session) or April 1 (for the Summer Session) can be processed in time to permit registrations in that session. A graduate of another university must arrange with the Registrar of that institution to forward two transcripts of his academic record to the Dean prior to August 15 or April 1. The Dean may require the applicant to furnish an official description of the content of the courses listed on the transcripts.

### 202.2.3 / REFUSAL OF ADMISSION

Notwithstanding the Admission Requirements referred to above (§ 202.2.1), The University of Alberta may in its discretion refuse admission to any applicant.

## 202.3 / *Registration*

### 202.3.1 / INITIAL REGISTRATION

An applicant who has been accepted by the Faculty as a qualifying graduate student, a probationary graduate student, a candidate for a master's degree, or a provisional candidate for a doctor's degree, must:

(1) register not later than September 12 if he proposes to enter on his program during the Winter Session (departmental approval of Program Form should be obtained during the preceding week), or not later than April 30 if he proposes to enter on his program in the Summer Session;

(2) if he registers later, pay a late registration fee for the Winter Session of $3.00 and an additional $1.00 per day for each day by which the registration is postponed beyond September 12;

(3) present on registration a program form signed by the head of his department. Registration cannot be proceeded with until the approved program form is available to the Faculty office. Program forms may be obtained from the office of the Dean or the department.

Special Graduate students are also required to register not later than September 12.

### 202.3.2 / CHANGES OF REGISTRATION

Deletion of courses or changes from "credit" to "audit" may be made only on recommendation of the Department in which the student is taking his graduate degree. Such changes of registration, first approved by the Department Head, must be received by the Faculty of Graduate Studies no later than six weeks prior to the date of the final lecture in the course(s) involved. No credit will be given for any course unless included on the program form or covered by an official change of registration.

NOTE: Individual departments may require an earlier deadline date for changes in course registration.

### 202.3.3 / MAINTENANCE OF REGISTRATION

Every student on a graduate degree program must register once a year in order to keep his program active. This registration entitles the student to the use of university facilities and to assistance from his supervisor for a twelve month period. Registration during the final year of the program permits the student to graduate at either of the two following Convocations.

The procedure for re-registration is the same as for initial registration, and the student must obtain a program form from his department and present it at registration even if he is registering for thesis only.

A student who fails to maintain continuous registration will be considered to have withdrawn from his program. If he wishes to resume work on the program, he must apply for re-admission to the Faculty

*Michener Park, the University's housing development for married students*

of Graduate Studies and have his program re-assessed in terms of the regulations in force at the time of re-application. If he is recommended for re-admission, a re-admission fee of $50.00 will be charged in addition to the fees assessed in the regular manner.

### 202.3.4 / INTERSESSION REGISTRATION

Graduate students who are working full-time on their graduate program during part or all of the period from May to September are encouraged to complete "Intersession Registration". Those holding University awards during this period *must* so register. Full residence credit is given for this period if the student is registered. There is no fee. Students who register for the Summer Session do not receive Intersession credit for the period of the Session.

## 202.4 / *Academic Standings*

Except in a qualifying year, the pass mark in *any* course taken for credit towards an advanced degree is a grade of 6. In a qualifying year, a grade of 4 or 5 may be accepted in an individual course, provided that the grade point average for the year's work is at least 6.

Graduate students are not permitted to take supplemental examinations. If, after consulting the department or the committee concerned, the Faculty decides that a graduate student is not making satisfactory progress in either course work or research, the student may be required to withdraw.

## 202.5 / *Thesis Regulations*

In graduate programs in which a thesis is required, the candidate shall prepare at least five copies of a master's thesis and at least six copies of a doctor's thesis.

Copies of University of Alberta theses are available in the Reference Room of the University Library. Each student is requested to look at appropriate examples, and to consult his supervisor or department head, before commencing preparation of his thesis. Samples of the title page and of the approval sheet are available in the office of the Faculty of Graduate Studies.

The following points should be observed:

(1) *Paper.* Regulation bond, 8½" x 11" in size, 20 lb. weight, Bell-Fast or equivalent quality, should normally be used for the initial copy. Carbon copies may be on 13 lb. bond. One type of paper must be used throughout a given thesis except for charts and figures. With special permission and in special cases, 14" paper may be used. A photographic process is acceptable for charts and diagrams.

(2) *Typing.* Any standard type is acceptable, but one size and style must be used consistently throughout the thesis. Electric typewriters with carbon ribbon generally produce the best copies. If multiple copies are prepared and one of these submitted as the original, the method of reproduction used should produce clear legible copies comparable to original typing on an electric typewriter or good quality offset duplication.

(3) *Margins.* A minimum left margin of 1½" is required. Other margins should be at least 1".

(4) *General Form and Style.* This may differ somewhat from department to department. The main point is consistency of form, tone, and level in a given thesis. It is recommended that students consult a manual on thesis writing that has been approved by their department.

At the option of the supervising department writers may use either footnotes or keyed bibliography, or both. Footnotes may be placed either at the foot of the page, or in a group at the end of the chapter or thesis.

(5) *Order of Items.*

(i) Title page.
(ii) Approval sheet (including, if desired, an indication of the weight of the thesis in the student's total program).
(iii) Abstract (not more than two pages).
(iv) Acknowledgment, if any.
(v) Table of contents (listing chapter heads and subheads, bibliography and appendix, if any).
(vi) List of tables, if any.
(vii) List of figures or illustrations, if any.
(viii) Body of text.
(ix) Bibliography or references.
(x) Appendix, if any.

(6) *Disposition of approved thesis.* When the thesis has been accepted by the examining committee and corrected or revised satisfactorily and all copies have been signed in ink by the members of the committee (no Xeroxed signatures), it is then to be brought, *before binding,* to the Faculty of Graduate Studies office for general inspection. If the thesis meets with the Faculty regulations as set out in the Calendar, the student will receive a signed statement to this effect. He will take the signed statement and the required number of copies of the thesis to

the University Bindery, where the cost of binding is to be prepaid. A statement from the Bindery attesting to the receipt of the thesis copies and the payment for binding is then to be brought or sent by the student to the Graduate Faculty Office.

One unbound copy of each doctor's thesis must be left with the Graduate Faculty Office for transmission to the National Library of Canada where it will be indexed and microfilmed. A fee of $5.00 must be paid to the Bursar's office at this time, to cover the costs involved.

(7) *Binding.* All copies should be bound in buckram (the color to be determined by the supervising department) with a short title and author's name printed in gilt on the spine. Official copies (the first three) *must* be so bound and lettered.

(8) *Distribution of Bound Copies.* As soon as the binding is completed, the bound copies will be sent by the Bindery to the department concerned. The department will then distribute copies of the thesis as follows:

The first copy (the original of typewritten theses) must be sent to the Faculty of Graduate Studies for subsequent transmission to the University Library.

The second and third copies are to be retained by the department, or (if a Faculty has its own library) to become the library and the department copy respectively. One of these copies will be available for interlibrary loan.

The fourth copy is retained by the student.

The fifth copy is retained by the supervisor; but, with the department's permission, this requirement may be waived.

Further copies may be required in special cases. For example, a student who holds a fellowship or financial assistance donated by a private individual or a company may be expected to provide a copy for the donor.

## 202.6 / *Oral Examination and Convocation*

Unless otherwise specified, each candidate must pass a final oral examination following the submission of his thesis. The finished thesis must be submitted to the examining committee at least two weeks before the oral examination.

In order to obtain his degree at the earliest Convocation following the completion of his thesis, the student must have submitted the unbound copies of his thesis to the Faculty Office on or before a date set by the Faculty to allow enough time for the student's name to appear in the Convocation program. The student should check with the Faculty Office to find out the submission date for the Convocation at which he wishes to take his degree.

## 202.7 / *Time Limit*

To be recommended for a degree a candidate must complete all of the requirements within six years of the time he is first registered for graduate study, except in the M.Eng. program in which the time limit is five years.

# 203 / DEGREE REGULATIONS

## 203.1 / *Master's Degrees*

### 203.1.1 / COMMON REGULATIONS

Except as noted in § 203.1.2 below, the following regulations apply to all master's degree programs.

(1) A student registered in a program for a master's degree must spend a minimum period of one academic year in full-time attendance at the University. An alternative proposal for meeting the residence requirement may be considered if recommended by the department concerned.

(2) A candidate entering the Faculty from a four-year specialized program and continuing work in the same field is normally required to complete the equivalent of one calendar year's work. Other candidates are normally required to complete the equivalent of two years' work, the first year as a qualifying student. Details are determined by the department concerned.

(3) Considerable variation is permitted in the balance between the research and the courses required for the degree. All candidates must include some course work in the program; and proposals involving research work equivalent to less than two full courses require Faculty approval.

(4) Some Summer Session and evening courses may be accepted in a master's degree program, but no more than three may be taken in any twelve-month period without approval of the Dean. Only in special circum-

stances, and with approval of the department involved, will extramural courses be accepted for credit.

(5) The results of research must be submitted in the form of a thesis conforming to the Faculty regulations.

(6) An examining committee of at least three faculty members, one from a department other than that in which the student is registered, must be approved by the Faculty. The committee will review the thesis and conduct an oral examination designed to test the candidate's knowledge of the thesis subject and of related fields. Persons other than the examiners may attend with the approval of the Dean or the chairman of the committee.

### 203.1.2 / SPECIAL REGULATIONS FOR PARTICULAR DEGREES

(1) For the *M.A. in Community Development,* in addition to the above requirements, a four-month field internship is required. (See § 204.15, below.)

(2) The *M.Eng.* differs from the M.Sc. in Engineering in the following particulars:

(i) the minimum residence requirement is one term;

(ii) The degree program consists of the equivalent of five full courses, and a project instead of a thesis;

(iii) the time limit is five instead of six years.

(3) In the program for the *M.F.A. in Drama* the thesis will be replaced by the presentation of a creative project and a related historical or critical essay. (See § 204.19, below.)

(4) In the program for the *M.Mus. in Applied Music,* the thesis will be replaced by the presentation of a special project and a performance requirement. (See § 204.44, below.)

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## 203.2 / *The Degree of Ph.D.*

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(1) A student may be admitted as a provisional candidate for the degree of Doctor of Philosophy if he holds a bachelor's or a master's degree, or equivalent, from an approved university. Admission is contingent upon recommendation by a department and upon the availability of suitable courses of study and library, laboratory, and other facilities. The student will remain as a provisional candidate until he has successfully completed his candidacy examination (see ¶ 6 below).

(2) The essential requirement for the doctorate is the planning and carrying out of research of high quality leading to an advance in knowledge in the candidate's field of study.

(3) The time necessary to complete the requirements for the doctorate depends upon the student's progress. For a student with a bachelor's degree the minimum requirement is three academic years of study and research, of which two academic years must be in residence at The University of Alberta. For a student with a master's degree the minimum requirement is two academic years of study and research in residence at The University of Alberta. An alternative method of meeting the residence requirement may be considered on recommendation to the Faculty of Graduate Studies by the department concerned.

(4) The student's program shall be under the direction of a committee of not fewer than three members appointed by the Faculty of Graduate Studies. The chairman of the committee shall be the faculty member under whose supervision the student is carrying out his research. Where appropriate, one or more members of the committee shall be chosen from a department other than that in which the research is being carried out. The committee shall recommend to the Faculty of Graduate Studies a program of research. The same committee shall arrange for the necessary examinations and for adjudication of the thesis.

(5) Before the student takes his candidacy examination, he shall satisfy his committee that he possesses a knowledge of one of French, German, or Russian sufficient for the reading of publications in this language. Departments may demand proficiency in such additional languages as are necessary.

(6) At least six months before he takes his final examination, the student shall pass a candidacy examination in subjects relevant to the general field of his research, and such other examinations as may be required by his department. Normally an oral examination is required, and will be held when the course work is generally completed and the thesis project well started. The examination shall be under the direction of the supervisory committee to which two other members of the teaching staff have been added. At least one member of the examining committee shall be a person from a department and discipline other than that in which the research is being carried out. Persons other than the examiners may attend only by agreement with the Dean of the Faculty of Graduate Studies or the chairman of the committee.

(7) The results of the candidate's research shall be presented in a thesis satisfying the general requirements of the Faculty of Graduate Studies. The material must be

of sufficient merit to meet the standards of reputable scholarly publications.

(8) The thesis shall be examined by an examining committee consisting of the supervisory committee and at least two other examiners. One member of the examining committee shall be from a department and discipline other than that in which the student is working, and one member shall be an external examiner who is a recognized authority in the special field of research.

(9) A final oral examination, based largely on the thesis, shall be conducted by the examining committee. Persons other than members of the Graduate Faculty Council or members of the staff of the major department may attend by agreement with the Dean of the Faculty of Graduate Studies.

## 203.3 / *Combined Program for the Degrees of M.D. and Ph.D.*

Highly qualified students desiring to pursue a career of teaching and research in either basic medical science or in clinical medicine may enrol in a program of six to seven years' duration leading to the acquisition of both an M.D. and a Ph.D. degree. Several possible routes by which this program may be completed are outlined below.

(1) A student may, after completion of two years of the medical program, withdraw from that program and apply for admission to the Faculty of Graduate Studies. If acceptable to the appropriate basic science department and to the Faculty of Graduate Studies, the student would embark upon a program leading to the Ph.D. degree. The time required for the completion of the requirements for the Ph.D. degree would depend upon the previous training of the applicant, and would be normally three years in the case of a student who had entered the Faculty of Medicine holding a B.Sc. degree, and four years in the case of a student who entered the Faculty of Medicine from a two-year premedical program. Upon completion of the Ph.D. program, the student could re-enter the Faculty of Medicine and complete the requirements for the M.D. degree.

(2) A student holding a B.Sc. degree may apply for admission to the Faculty of Graduate Studies after the first or second year of the M.D. program. If accepted, the student would continue the M.D. program without interruption, but would register in the Faculty of Graduate Studies during each intersession period throughout the course of the M.D. program (these intersession periods would be spent in that basic science department from which the student wished to obtain the Ph.D. degree). Upon completion of the M.D. program, the student would return to the appropriate basic science department and complete the program leading to the Ph.D. degree. The time required to do so would vary from student to student, but usually would be not less than two years.

(3) A student who has entered the Faculty of Medicine from a two-year premedical program may apply for admission to the Faculty of Graduate Studies after the second year of the M.D. program. If accepted, the student would continue the M.D. program without interruption, but would register in the Faculty of Graduate Studies during each intersession period throughout the course of the M.D. program (these intersession periods would be spent in that basic science department from which the student wished to obtain the Ph.D. degree). Upon completion of the M.D. program, he would return to the appropriate basic science department and complete the program leading to the Ph.D. degree. The time required to do so would vary from student to student, but usually would be not less than three years.

Students interested in such a program may obtain further information from the head of the appropriate basic science department.

## 203.4 / *The Degree of Ed.D.*

The degree of Doctor of Education attests proficiency in a program of graduate study in which the emphasis is upon preparation for competent professional performance. The general regulations with respect to admission, residence requirements, candidacy examinations and final examinations for the Ed.D. degree are the same as those listed for the Ph.D. degree with the following exceptions:

(1) Several years of successful teaching and an M.Ed. degree or its equivalent are prerequisites for admission.

(2) A reading knowledge of French is required. In special circumstances another language may be substituted.

(3) The program emphasizes breadth in educational theory, practice, and research rather than intensive specialization in a particular area.

(4) The student's program may make provision for supervised field experience.

*Downtown Edmonton, seen from the campus*

## 203.5 / *The Degrees of D.Sc. and D.Litt.*

The degree of Doctor of Science (D.Sc.) or of Doctor of Letters (D.Litt.) may be conferred on persons considered by the General Faculty Council to have distinguished themselves by special research or learning in the respective domains of science and of the humanities or social sciences, subject to the following regulations:

(1) The degrees of Doctor of Science and of Doctor of Letters are awarded exclusively on the basis of original work of exceptional merit carried out by the candidate, either individually or in co-operation with others. In the case of an application based upon co-operative work, the candidate shall submit a written statement indicating the share he personally has taken in the work. A reasonable proportion of the work must have been carried out at The University of Alberta.

(3) Application must be made in writing to the Dean of the Faculty of Graduate Studies and should be accompanied by four offprints of all papers and by at least one copy of each book submitted by the candidate. The application, accompanied by the proper fee, must be submitted before November of the academic year in which it is proposed to take the degree.

# 204 / GRADUATE PROGRAMS AND COURSES

## 204.1 / *General Information*

A brief description of each program offered under the auspices of the Faculty of Graduate Studies is given in alphabetical order in the following sections. Prospective applicants should note particularly the admission requirements, the fields in which research may be carried out, and the requirements for each program in addition to the general requirements of the Faculty of Graduate Studies.

Both graduate courses and undergraduate courses which may be taken for credit in a graduate program are listed following the description of the program.

Each course is designated by its computer abbreviation and a number. Students should use this abbreviation and number when filling in their registration forms.

Following the title of the course is (in most instances) the symbol "•" standing for "course weight" and a number indicating the weight of the course as used in computing grade-point averages. A normal full-year course is weighted 6. Half-courses are weighted 3. Some courses involving research may vary in weight according to the length and difficulty of the project.

The next two figures, enclosed in parentheses, indicate the number of lecture and laboratory hours required by the course in a week. Where it appears, the symbol "s" indicates seminar hours; "L" indicates combined lecture-laboratory hours. If the course is a half-course, the term in which it is offered is mentioned.

The appearance of a course description in the following lists does not constitute any guarantee that the course will actually be offered in the forthcoming session. Information as to which courses will be offered, the names of the instructors, and all further details must be sought from the department concerned.

## 204.2 / *Agricultural Economics*

### 204.2.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Agricultural Economics offers programs leading to the degrees of Master of Science and Doctor of Philosophy.

(2) Research for the M.Sc. may be carried out in various fields, including agricultural business management, rural social and economic development, agricultural finance, human resources, commodity trade, land and water resources, marketing, policy, prices, and production economics. Research for the Ph.D. is limited to the fields of resource development. marketing, and production economics.

(3) Applicants for admission to these programs should present undergraduate credit in one mathematics course, one statistics course, two economic theory courses, three agricultural economics courses, and one related social science course, and should have obtained at least a high Second Class average in such courses (grade-point average of 6.5). (Applicants from most foreign universities are required

to have an average of 80 per cent or B+.) An applicant who does not meet all of the Department's undergraduate requirements may be admitted on a qualifying or probationary basis but must make up all deficiencies before he can become a candidate for the Master's degree.

The requirements for admission as a candidate for the Ph.D. are an approved master's degree in agricultural economics or a closely related field or an approved bachelor's degree and substantial progress toward an advanced degree involving at least one year of graduate work.

(4) Master of Science—In addition to writing his thesis, a candidate is expected to take a minimum of three graduate courses (not counting courses he must take to make up deficiencies in his undergraduate program). At least one of these must be in another field related to agricultural economics. Approved 400-level courses may be taken as part of the graduate program.

(5) Doctor of Philosophy—In addition to the dissertation, a candidate must prepare candidacy papers in each of four fields (a 600-level economics theory, an area of specialization in agricultural economics at the 600-level, a supporting field, and an area to be selected by the candidate and approved by the advisory committee), complete the language requirement, and pass an oral examination covering the four selected fields and agricultural economics in general.

(6) A candidate with a high scholastic standing and no undergraduate deficiencies may complete the Master of Science program in as little as twelve months, but most students will require two academic years. A well-qualified doctoral candidate should complete all requirements in two years beyond the Master's degree.

(7) A number of teaching, service, and research assistantships are available for qualified applicants. Students holding teaching or service assistantships should expect to take additional time to complete their graduate programs.

(8) Inquiries should be directed to the head of the Department.

### 204.2.2 / UNDERGRADUATE COURSES

The following may be taken for graduate credit:

*Agricultural Economics*

AG EC 416. *Statistical Analysis.* ♦3 (either term, 3-3).
AG EC 422. *Managerial Economics for Agricultural Businesses.* ♦3 (First Term, 3-0).
AG EC 423. *Management Techniques in Agriculture.* ♦3 (Second Term, 3-0).
AG EC 433. *Agricultural Production Economics.* ♦3 (either term, 3-0).
AG EC 443. *Agricultural Finance.* ♦3 (First Term, 3-0).
AG EC 453. *Land Economics.* ♦3 (Second Term, 3-0).
AG EC 463. *Agricultural Marketing Economics.* ♦3 (Second Term, 3-0).
AG EC 473. *Agricultural Policy.* ♦3 (either term, 3-0).
AG EC 492. *Agricultural Growth and Adjustment.* ♦3 (either term, 3-0).

*Rural Sociology*

R SOC 456. *Rural Social Problems and Public Policy.* ♦3 (either term, 3-0).
R SOC 457. *Theory and Practices in Rural Extension.* ♦3 (either term, 3-0).
R SOC 458. *Agrarian Social Movements.* ♦3 (either term, 3-0).

### 204.2.3 / GRADUATE COURSES

*Agricultural Economics*

AG EC 500. *Research Projects in Agricultural Economics.*
AG EC 515. *Agricultural Econometrics.* ♦6 (3-0).
AG EC 535. *Production Economics.* ♦6 (3-0).
AG EC 553. *Economics of Land Use and Conservation.* ♦3 (either term, 3-0).
AG EC 565. *Market Structure and Performance.* ♦6 (3-0).
AG EC 583. *Price Analysis and Forecasting.* ♦3 (either term, 3-0).
AG EC 601. *Agricultural Economics Seminar.* ♦2 (1s-0).
AG EC 613. *Research Methods.* ♦3 (either term, 3-0).
AG EC 635. *Seminar in Production Economics.* ♦6 (3s-0).
AG EC 655. *Seminar in Resource Economics.* ♦6 (3s-0).
AG EC 665. *Seminar in Marketing Economics.* ♦6 (3s-0).

*Rural Sociology*

R SOC 556. *Human Resources Development.* ♦3 (either term, 3-0).
R SOC 557. *Comparative Rural Societies.* ♦6 (3-0).

## 204.3 / *Agricultural Engineering*

### 204.3.1 / THE DEGREE OF M.SC.

(1) The Department of Agricultural Engineering offers a program leading to the degree of Master of Science, with the major field of study being agricultural mechanization.

(2) Course work and graduate research is directed towards developing competence in the quantitative economic approach to the mechanization of farms and ranches, rather than towards the mechanical design of agricultural equipment. Required courses include Statistics, Numerical Analysis, Production, and a graduate course in Operations Research offered by the Department of Agricultural Engineering. Research work leading to the preparation of a thesis generally takes the form of a quantitative assessment of the level of mechanization of

some phase of Western Canadian agriculture. In particular cases graduate students may select some phase of irrigation for investigation, in which case they will conduct part of their research at the Lethbridge Research Station.

(3) Funds are available for one or two graduate students to be engaged by the Department of Agricultural Engineering as research assistants. Such students should expect to take an extra year to complete the requirements for the Master of Science degree.

### 204.3.2 / GRADUATE COURSES

AG ENG 600. *Agricultural Engineering Seminar.* 0-1s).

AG ENG 601. *Operations Research.* ♦6 (3-3). Application of statistical and mathematical techniques to selected problems in agricultural mechanization.

## 204.4 / *Anatomy*

### 204.4.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department offers a program of course work and research leading to the degree of M.Sc. or Ph.D.

(2) The Department has well equipped research laboratories for investigations in the fields of gross anatomy, histology, histochemistry, cytology, neuroanatomy and embryology.

(3) Programs leading to the degree of M.Sc. are open to medical and dental graduates and to science graduates of a four-year program. Applicants for the Ph.D. program must be medical or dental graduates or hold a master's degree.

(4) The M.Sc. program usually covers two years, with a minimum of three years for the Ph.D.

(5) Information regarding assistantships and other forms of financial assistance will be supplied upon request.

(6) Address all inquiries to the head of the Department.

### 204.4.2 / GRADUATE COURSES

ANAT 601. *Histology-Cytology.* ♦2 (First Term, 2-4).

ANAT 602. *Developmental Anatomy.* ♦2 (First Term, 2-4).

ANAT 604. *Advanced Neuroanatomy.* ♦2 (First Term, 2-2).

## 204.5 / *Animal Science*

### 204.5.1 / THE DEGREES OF M.SC. AND PH.D.

(1) Graduate study leading to the degrees of Master of Science or Doctor of Philosophy may be undertaken in genetics, nutrition or physiology in either the Animal Science or the Poultry Science division of the Department of Animal Science. A well-equipped chemical laboratory is maintained for research purposes.

(2) Normally M.Sc. students are required to complete two of the Animal Science graduate courses listed below plus at least two approved courses selected from the following areas: Biochemistry, Biometrics, Chemistry, Genetics, Mathematics, Physiology and Zoology.

(3) The time required to complete a master's program varies according to the undergraduate training of the student and the nature of the research undertaken. Normally two academic years of course work and research plus one summer of research, or one academic year and two summers, are needed.

(4) Courses for Ph.D. students are selected according to the background and interests of the candidates.

(5) Information regarding assistantships and other forms of financial assistance currently available to graduate students will be supplied upon request; address inquiries to the head of the Department.

### 204.5.2 / GRADUATE COURSES

AN SC 501. *Research Project.* ♦varies from 2 to 6 depending on the project.

AN SC 512. *Advanced Animal and Poultry Nutrition.* ♦6 (3-0).

AN SC 580. *Biometrical Techniques in Animal Improvement.* ♦3 (First Term, 2-3).

AN SC 600. *Seminar.* ♦1 (0-1s).

AN SC 680. *Research Techniques in Quantitative Animal Genetics.* ♦3 (Second Term, 2-4).

## 204.6 / *Anthropology*

### 204.6.1 / THE DEGREES OF M.A. AND PH.D.

(1) The Department of Anthropology offers the Master of Arts and Doctor of Philosophy degrees within the field of cultural anthropology, including social anthropology, ethnology and archaeology. Entrance requirements are those of the University.

(2) Requirements for the M.A. degree in addition to those of the University are:

(i) Sufficient course work to prepare the student adequately for a comprehensive examination, to ensure a well-rounded training in anthropology, and a general knowledge in all fields of anthropology.

(ii) Passing a comprehensive examination in areas within the discipline chosen by the student and approved by the Department.

(iii) Demonstration of a reading knowledge of a relevant modern language other than English.

(3) Requirements for the Ph.D. degree in addition to those of the University are:

(i) Courses beyond those required for the M.A. as deemed necessary by the Department.

(ii) Demonstration of competence in selected areas within anthropology. The stress at this level is on the integration of the various branches of the discipline.

(iii) Reading knowledge of a second language.

(iv) A thesis ordinarily based on field work. In any event, the student must satisfactorily indicate to the Department that he is capable of undertaking field research.

(4) The M.A. program in Anthropology normally requires two years while a person working for a Ph.D. may expect to take from five to six years after the B.A. before completing this degree.

(5) The Department has a number of teaching, research and service assistantships.

(6) Students contemplating graduate work in Anthropology should direct their inquiries to the chairman of the Department.

### 204.6.2 / GRADUATE COURSES

ANTHR 500. *Proseminar in Anthropology.* ♦6 (3-0).
ANTHR 503. *Anthropology of Conflict.* ♦6 (3-0).
ANTHR 504. *Methods in Ethnology and Social Anthropology.* ♦6 (3-0).
ANTHR 510. *Theory of Culture.* ♦6 (3-0).
ANTHR 515. *Seminar: The Transmission of Culture.* ♦6 (3-0).
ANTHR 525. *Seminar: Problems in the Anthropology of Art.* ♦4 (2-0).
ANTHR 530. *Comparative Agrarian Societies.* ♦6 (3-0).
ANTHR 535. *Anthropology and the Nation-State.* ♦6 (3-0).
ANTHR 540. *Regional Ethnology.* ♦6 (3-0).
ANTHR 541. *Regional Archaeology.* ♦6 (3-0).
ANTHR 542. *Individual Research.* ♦6 (3-0).
ANTHR 590. *Advanced Physical Anthropology.* ♦6 (3-3). Prerequisite: Anthropology 390 or consent of the Department.
ANTHR 595. *Seminar in Archaeology.* ♦6 (3-3).
ANTHR 596. *Field Methods in Archaeology.* ♦6 (3s-3).

## 204.7 / *Bacteriology*

### 204.7.1 / THE DEGREE OF M.SC.

(1) The department offers programs leading to the degree of Master of Science after one or more years, depending on prior training.

(2) Excellent facilities and equipment are available for research in most areas of Bacteriology. Research interests of the staff include: mycoplasma and human disease, infectious agents in arthritis, automated and other new approaches to microbial identification, numerical taxonomy, enterobacteriology, epidemiology of arboviruses, zoonoses, hospital infections, production of viral DNA in mammalian cells, and classification of fungi.

(3) Students considering a graduate program in Bacteriology should contact the head of the Department as early as possible in the year preceding enrollment. Most applications for financial support are made in November.

### 204.7.2 / GRADUATE COURSES

BACT 501. *Directed Studies Program.* ♦3 (0-3).
BACT 504. *Medical Mycology.* ♦3 (either term, 0-3).

## 204.8 / *Biochemistry*

### 204.8.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Biochemistry offers programs leading to the degree of Master of Science or Doctor of Philosophy.

(2) The staff of the Department is currently carrying out research in the following fields: cell-virus interactions and mechanisms of viral replication; chemical, physical and biological properties of the nucleic acids; physico-chemical and enzymatic properties of muscle proteins; chemical and physical properties of the proteolytic zymogens and enzymes; the effects of inhibitors, activators and protein reagents on the kinetic and physico-chemical properties of glycogen phosphorylase and other enzymes; the biological control of metabolism; oxidation-reduction processes in reactions catalysed by peroxidases and catalases; chemistry of mamalian erythrocytes; metabolism of purines and purine analogues in cancer cells; clinical chemistry.

(3) A number of courses from the Departments of Chemistry, Bacteriology, Physiology, Genetics, Botany, and Zoology may be accepted as part of the graduate

program in consultation with the head of the Department of Biochemistry.

(4) Prospective candidates should consult the head of the Department regarding research facilities and course requirements. Teaching and research assistantships and demonstratorships are available.

### 204.8.2 / GRADUATE COURSES

BIOCH 501. *Advanced Laboratory.* ♦6 (0-6).
BIOCH 511. *Enzymology.* ♦3 (First Term, 3-0). N. B. Madsen, G. R. Schonbaum and W. A. Bridger.
BIOCH 512. *Metabolic and Cellular Control Mechanisms.* ♦3 (Second Term, 3-0). N. B. Madsen and W. Paranchych.
BIOCH 521. *Nucleic Acids.* ♦3 (Second Term, 3-0). J. S. Colter, C. J, Smith and E. S. Townsend.
BIOCH 531. *Chemistry of Proteins.* ♦3 (First Term, 3-0). L. B. Smillie and C. M. Kay.
BIOCH 541. *Nucleotide Metabolism.* ♦3 (Second Term, 3-0). A. R. P. Paterson, J. F. Henderson, and A. Hampton.
BIOCH 561. *Chemistry of the Erythrocyte.* ♦3 (Second Term, 3-0). H. B. Collier.
BIOCH 571. *Recent Advances.* ♦4 (2-0).

## 204.9 / *Biology*

### 204.9.1 / GENERAL INFORMATION

A number of graduate courses in Biology are offered by members of the Departments of Botany, Entomology, Genetics, Microbiology, and Zoology. As there is, however, no formal graduate program in general Biology, prospective students should apply to the department most appropriate to their interests.

### 204.9.2 / GRADUATE COURSES

BIOL 415. *History and Theory of Biology.* (First Term, 3-0).
BIOL 445. *Cell Physiology.* (Second Term, 3-3).
BIOL 584. *Biological Ultrastructure.* (First Term, 3-0).
BIOL 585. *Electron Microscopy.* (Second Term, 3-3). Not offered 1968-69.
BIOL 620. *Seminar in Selected Topics of Modern Biology.* (Second Term, 3-0).

## 204.10 / *Botany*

### 204.10.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Botany offers programs leading to the degrees of Master of Science and Doctor of Philosophy.

(2) The Department has well equipped research laboratories for investigations in the following fields: *Anatomy*—developmental studies with roots, root hairs and leaves; *Biochemistry* and *Physiology*—the biochemistry of seed germination, pathways for amino acid biosynthesis, studies of transmethylation and transamination reactions, intermediary metabolism of higher plant tissues; *Ecology*—synecological studies of grassland, parkland, mountain boreal and subarctic plant communities with emphasis on structure, classification, and productivity; *Morphogenesis*—studies in growth correlations, organogenesis, tissue differentiation, phyllotaxis, and plant movement; *Mycology*—sexuality and cytology of fungi, taxonomy of Gasteromycetes, mechanisms of spore dispersal, classification of Basidiomycetes; *Paleobotany*—studies of megafossils with emphasis on vascular plant evolution; *Phycology*—ecology of freshwater algae; *Taxonomy*—studies of Western Canadian and Arctic taxa using a variety of modern techniques including cytology and chromatography.

(3) A number of senior and advanced courses offered by other departments in the Faculty of Science are accepted as part of graduate programs in Botany. The head of the Department of Botany must be consulted in the selection of these.

(4) Teaching and research assistantships are available for qualified students as well as financial assistance through research grants to staff members in some fields of botany. Financial assistance can usually be arranged for graduate students during the summer months.

### 204.10.2 / GRADUATE COURSES

BOT 504. *Advanced Mycology.* ♦6 (6L). H. J. Brodie, L. L. Kennedy.
BOT 506. *Advanced Taxonomy.* ♦6 (6L). J. G. Packer.
BOT 507. *Advanced Plant Anatomy and Histology.* ♦6 (6L). R. G. H. Cormack.
BOT 508. *Vegetation Analysis.* ♦3 (Second Term, 3-3). G. H. La Roi.
BOT 510. *Environment Analysis.* ♦3 (First Term, 3-4). G. H. La Roi.
BOT 511. *Advanced Plant Ecology.* ♦3 (Second Term, 3-0). G. H. La Roi and L. C. Bliss.
BOT 531. *Advanced Phycology.* ♦6 (6L). L. L. Kennedy.
BOT 551. *Advanced Plant Biochemistry.* ♦3 (either term, 3-0). Note: This course is identical to Plant Physiology and Biochemistry 551. M. Spencer and E. A. Cossins.
BOT 560. *Advanced Paleobotany.* ♦6 (6L). W. N. Stewart.

## 204.11 / *Business Administration and Commerce*

### 204.11.1 / THE DEGREE OF M.B.A.

(1) The Faculty of Business Administration and Commerce offers a program leading to the degree of Master of Business

Administration designed for students preparing for a career in management.

(2) No specific undergraduate major or series of courses is required for entrance. The program has been designed to accommodate those who have their undergraduate academic training in the liberal arts, engineering or the sciences, as well as commerce graduates.

(3) Admission into the M.B.A. program requires the applicant to meet the requirements of the Faculty of Graduate Studies and be approved by the Faculty of Business Administration and Commerce. Approval by the Faculty of Business Administration and Commerce depends upon the undergraduate grades, test score on the Admissions Test for Graduate Study in Business, and practical experience of the applicant. All applicants are required to write the Admission Test for Graduate Study in Business and have their scores forwarded to the Chairman, Division of Graduate Studies, Faculty of Business Administration and Commerce. Write to Admission Test for Graduate Study in Business, Educational Testing Service, Princeton, New Jersey for further information about this test.

(4) It is strongly recommended that applicants have had experience in business or government before entering the M.B.A. program.

(5) The time required to complete the Master's program varies according to the undergraduate program of the student and the thesis project undertaken. A student with a four-year degree in commerce or business administration may complete the requirements in one year. Other students will normally take two years.

(6) The first year of the program consists of accelerated undergraduate courses covering the areas of accounting, finance, marketing, production, research methodology, statistics, and economic analysis. In the second year the student is required to take Business 551, 555, 556, and one of the advanced seminars.

(7) A limited number of fellowships and assistantships is available.

(8) For more information write to the Chairman, Division of Graduate Studies, Faculty of Business Administration and Commerce.

### 204.11.2 / GRADUATE COURSES

ACCTG 561. *Seminar in Financial Accounting Theory.* ♦3 (First Term, 3-0). An examination of several topics in accounting history and current financial accounting thought.

ACCTG 562. *Seminar in Managerial Accounting.* ♦3 (Second Term, 3-0). Examination of several managerial accounting concepts and current research.

BUS 452. *Introductory Financial Accounting.* ♦3 (First Term, 3-2). Emphasis on reporting to shareholders, creditors and other external decision makers. Case analyses and written reports are required.

BUS 453. *Managerial Control Systems.* ♦3 (Second Term, 3-2). An introduction to managerial information and control systems. Cost and revenue accumulation for pricing, control and product costing purposes are examined. Case analyses and written reports are required.

BUS 456. *Finance.* ♦3 (Second Term, 3-0). The management of funds and business operations from the viewpoint of the chief financial officer.

BUS 458. *Marketing.* ♦3 (First Term, 3-0). The management of marketing operations.

BUS 459. *Production.* ♦3 (First Term, 3-0). The management of production operations.

BUS 460. *Research Methods.* ♦3 (either term, 3-0). The principles and techniques of business research.

BUS 461. *Elementary Statistics.* ♦3 (First Term, 3-0). Elementary statistical methods applied to business decisions.

BUS 462. *Business Statistics.* ♦3 (Second Term, 3-0). Statistical methods applied to business decisions.

BUS 463. *Business Analysis.* ♦3 (First Term, 3-0). Forecasting for the business firm.

BUS 464. *Business Analysis.* ♦3 (Second Term, 3-0). Forecasting for industry.

BUS 551. *Administrative Policy.* ♦6 (3-0). A study of interpersonal relations, small group functioning and formal organization.

BUS 555. *Business Policy.* ♦3 (First Term, 3-0). An examination of inter-firm and intra-firm relationships.

BUS 556. *Business Policy.* ♦3 (Second Term, 3-0). The social, political, cultural and ethical environment of business with the emphasis on the responsibilities of business leadership.

BUS 565. *Business Analysis.* ♦6 (3-0). Advanced seminar in the use of micro- and macro-economics and multiple correlation analysis for business and economic research.

FIN 561. *Advanced Seminar in Finance.* ♦6 (3-0).

IR 564. *Advanced Seminar in Industrial Relations.* ♦6 (3-0).

MARK 563. *Advanced Seminar in Marketing.* ♦6 (3-0).

PROD 562. *Advanced Seminar in Production.* ♦6 (3-0).

## 204.12 / *Chemical and Petroleum Engineering*

### 204.12.1 / THE DEGREES OF M.ENG., M.SC. AND PH.D.

(1) The Department of Chemical and Petroleum Engineering offers facilities for advanced training and research leading to the Master of Engineering, Master of Science, and Doctor of Philosophy degrees in Chemical Engineering and Petroleum Engineering.

(2) In Chemical Engineering, active research programs are being carried out in the following fields: rheology of non-Newtonian fluids, two-phase flow, hydrocarbon P-V-T and gas hydrate studies, computer models of chemical reactors, applied mathe-

matics in design, vapor phase reactions of the lower paraffin hydrocarbons, reaction kinetics and catalysis, process dynamics and control, on-line computer data acquisition and control.

(3) In Petroleum Engineering, facilities are available for research in fluid flow through porous media, electrical and physical characteristics of reservoir rocks, crude oil rheology and pipeline flow, miscible fluid displacement phenomena, flow phenomena in heterogeneous rock systems.

(4) For the Master of Engineering program, work equivalent to ten one-term courses plus the engineering project, either Chemical Engineering 500 or Petroleum Engineering 500, must be completed. The courses are of the same type and calibre as those taken by M.Sc. and Ph.D. candidates. The project may be completed within a four- to six-week period following the regular winter session, so that the M.Eng. program may be completed in a minimum of nine months of full-time study. The minimum residence requirement is one term for a B.Sc. graduate with at least one year post B.Sc. experience and one session for a B.Sc. graduate with less than one year of post B.Sc. experience. The maximum time permitted for completion of a Master of Engineering program is five years from the date of first registration.

(5) For the M.Sc. degree, graduate work equivalent to a minimum of twelve months of full-time study is required for a student possessing an undergraduate degree in the same field from a recognized university. The Department will also accept qualified applicants for the M.Sc. degree in Petroleum Engineering with degrees in Chemical, Mechanical, or other fields of Engineering. Graduates with non-engineering backgrounds may be admitted under special arrangements which may involve the completion of certain undergraduate engineering courses. The M.Sc. programs are designed so that courses with a total weight of 18 to 24 make up one-half to two-thirds of the program, the balance consisting of research and thesis. Certain graduate courses are mandatory. Details of all programs must be worked out in consultation with the Department.

(6) For the Ph.D. program, in addition to the requirements of the Faculty of Graduate Studies, the Department requires the candidate to have satisfactorily completed approved courses in his major field and in at least one minor. Minimum requirements in the major field are courses with a total weight of 21, exclusive of seminar; minimum requirements in the minor field are courses with a total weight of 12.

(7) As a requirement for admission to candidacy for the Ph.D., a student must pass the comprehensive examinations set by the Department. These are three written three-hour examinations embracing the major fields of Chemical Engineering or Petroleum Engineering. They are normally taken by the student after one year of graduate studies during which the bulk of the course requirements have been met. Although the timing depends on circumstances, comprehensive examinations are normally held at the end of May.

(8) Teaching assistantships are available for qualified students on a part-time or full-time basis with remuneration according to the student's background and the hours of service. Scholarships and fellowships are available for research in both the fields of Chemical and Petroleum Engineering. Summer assistance can usually be arranged for students continuing their research through the summer months without scholarship support.

## 204.12.2 / GRADUATE COURSES

### *Chemical Engineering*

CH E 512. *Selected Topics in Fluid Mechanics.* ♦3 (First Term, 3-0).

CH E 514. *Advanced Heat Transfer.* ♦3 (First Term, 3-0).

CH E 524. *Advanced Thermodynamics.* ♦3 (Second Term, 3-0). Estimation of thermodynamic properties; feasibility of reactions; application to industrial problems.

CH E 582. *Graduate Seminar.* ♦1 (0-1s). Discussion of progress and problems in research underway in the Department.

CH E 594. *Advanced Topics in Chemical Engineering.* ♦3 (First Term, 3-0). An advanced treatment of selected chemical engineering topics of current interest to staff and students.

### *Petroleum Engineering*

PET E 500. *Design Project.* An engineering project course for students registered in a Master of Engineering program.

PET E 522. *Advanced Physical Properties and Behavior of Petroleum Fluids.* ♦3 (Second Term, 3-0). D. B. Robinson. Phase behaviour of multicomponent hydrocarbon and hydrocarbon-non-hydrocarbon systems; prediction of equilibrium ratios.

PET E 532. *Advanced Topics in Petroleum Production Mechanics.* ♦3 (First Term, 3-0). P. M. Dranchuk. Physical properties of porous media; single phase and multiphase fluid flow.

PET E 534. *Secondary Recovery.* ♦3 (Second Term, 3-0). P. M. Dranchuk. An advanced study of pressure maintenance utilizing the fractional flow and frontal advanced rate equation.

NOTE: For additional courses in Chemical and Petroleum Engineering see § 204.66.

## 204.13.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Chemistry has research laboratories and instructional facilities for at least one hundred and fifty graduate students proceeding to the M.Sc. and Ph.D. degrees in Chemistry.

(2) The active research interests of the staff include:

(i) *Analytical*: absorption spectra, polarography, gas chromatography, electroanalytical techniques, electrochemistry of fused salts, oxidation-reduction and metal co-ordination reactions in water and non-aqueous solvents and their application to analysis.

(ii) *Inorganic*: transition metal fluorides, halogen and perfluoralkyl derivatives of phosphorus, organometallic compounds, metal carbonyls, covalent metal-metal bonds, mechanism of inorganic substitution and electron transfer reactions, x-ray crystallography.

(iii) *Organic*: structural and synthetic studies on natural products, degradation of natural products, heterocyclic chemistry, mono- and di-saccharides, selective reductions, organometallic chemistry, pyrolysis mechanisms of pyrazolines and other organic compounds, mechanisms and stereochemistry of solvolytic reactions, small rings, reactive intermediates (ylides, carbenes, nitrenes), alkali metal aromatic complexes, organic photochemistry, acetylenes, allenes, free radicals, conformation and synthesis of carbohydrates, structure activity correlations of antibiotics, synthetic and mechanistic investigations in the heterocyclic field with emphasis on the applications of NMR and EPR, synthesis of strained systems, synthesis of $\pi$ electron systems, chemistry of 'onium compounds, mechanism of free radical reactions.

(iv) *Physical*: photosensitized reactions, kinetics and spectroscopy of nitrogen atom reactions, relaxation kinetics of ligand binding by peroxidase, photochemical synthesis and kinetics, electron spin resonance, flash photolysis, mass spectrometry, radiation chemistry of organic compounds, acid-base catalysis, electronic absorption and emission spectroscopy, mass spectrometric studies of free radicals, ion molecule reactions, ions in the gas phase, high resolution nuclear magnetic resonance, near- and far-infrared spectra of solids, lattice, vibrations, high pressure phases.

(v) *Theoretical*: molecular orbital methods, quantum mechanics, theories of the solid state and molecular collisions.

(3) Candidates for the M.Sc. and Ph.D. degrees in Chemistry should be graduates in Chemistry or Chemical Engineering from approved universities, who meet the entrance requirements of the Faculty of Graduate Studies.

(4) *The M.Sc. Program*: A minimum of four one-term graduate lecture courses in chemistry must be included. In some circumstances advanced standing for honors or graduate courses in chemistry taken elsewhere may be granted for a maximum of two of these one-term courses. A research project must be carried out, the results of which are presented in seminar and thesis form, the later followed by an oral examination.

(5) *The Ph.D. Program*: For students in all fields except organic chemistry, seven one-term courses, of which at least five are honors or graduate courses in chemistry, must be included. In some circumstances, advanced standing for honors or graduate courses in chemistry taken elsewhere may be granted, up to a maximum of three one-term courses. Students in organic chemistry must take four one-term honors or graduate courses and write monthly cumulative examinations in organic chemistry until seven have been passed. Every student must demonstrate a reading knowledge of two of the French, German, and Russian languages. He must also present a seminar on a topic other than his research program. When these requirements are successfully completed and his research is well advanced, each Ph.D. student must pass an oral candidacy examination, largely on his major field of research. Finally the results of the student's research are presented in thesis form and orally to an examining committee, and as a seminar to the Department as a whole.

(6) The minimum time required for an M.Sc. degree is twelve months after an honors B.Sc. degree in Chemistry, or a four-year specialized program in Chemistry. The minimum time required for a Ph.D. degree is three academic years of study and research after the B.Sc. degree. The length of time in each depends on the student's progress and the amount of time he can devote to his study and research.

(7) Financial assistance is normally available for all graduate students who maintain a satisfactory performance. This is in the form of scholarships, research assistantships, or teaching assistantships.

(8) Information may be obtained by writing the head of the Department.

CHEM 503. *Special Topics in Chemistry.* ♦3 (either term, 3-0).
CHEM 511. *Instrumentation in Chemical Analysis.* ♦3 (First Term, 3-6).
CHEM 513. *Electronics for Scientists.* ♦3 (Second Term, 3-3).
CHEM 515. *Electronanalytical Chemistry and Polarography.* ♦3 (First Term, 3-0).
CHEM 530. *Inorganic Chemistry.* ♦6 (3-3).
CHEM 533. *Structure in the Solid State.* ♦3 (Second Term, 3-0).
CHEM 535. *Selected Topics in Advanced Inorganic Chemistry.* ♦3 (Second Term, 3-0).
CHEM 550. *Organic Chemistry.* ♦6 (3-6).
CHEM 551. *Qualitative Organic Analysis.* ♦3 (First Term, 2-6).
CHEM 553. *Chemistry of Carbohydrates.* ♦3 (Second Term, 3-0).
CHEM 555. *Theoretical Organic Chemistry.* ♦3 (First Term, 3-0).
CHEM 557. *Free Radical Reactions in Organic Chemistry.* ♦3 (Second Term, 3-0).
CHEM 559. *Natural Products.* ♦3 (Second Term, 3-0).
CHEM 561. *Advanced Organic Synthesis.* ♦3 (First Term, 3-0).
CHEM 563. *Heterocyclic Chemistry.* ♦3 (Second Term, 3-0).
CHEM 572. *Advanced Physical Chemistry.* ♦6 (3-6).
CHEM 573. *Electrochemistry.* ♦3 (Second Term, 3-0).
CHEM 583. *Quantum Chemistry.* ♦3 (Second Term, 3-0).
CHEM 587. *Special Topics in Free Radical Chemistry.* ♦3 (Second Term, 3-0).
CHEM 589. *Statistical Mechanics.* ♦3 (Second Term, 3-0).
CHEM 591. *Radiation Chemistry.* ♦3 (First Term, 3-0).
CHEM 593. *Molecular Spectroscopy.* ♦3 (Second Term, 3-0).
CHEM 595. *Photochemistry.* ♦3 (First Term, 3-0).
CHEM 597. *Macromolecular Chemistry.* ♦3 (First Term, 3-0).
CHEM 599. *Chemical Applications of Mass Spectrometry.* ♦3 (First Term, 3-0).
CHEM 602. *Departmental Research Seminar.* ♦0 (2s-0).
CHEM 604. *Advanced Research Seminar.* ♦0 (2s-0).
CHEM 615. *Advanced Analytical Chemistry.* ♦3 (First Term, 3-0).
CHEM 617. *Analytical Spectroscopy.* ♦3 (Second Term, 3-0).
CHEM 637. *Topics in Structural Inorganic Chemistry.* ♦3 (Second Term, 3-0).
CHEM 639. *Inorganic Reaction Mechanisms.* ♦3 (Second Term, 3-0).
CHEM 641. *X-Ray Crystallography.* ♦3 (First Term, 3-0).
CHEM 655. *Physical Methods of Organic Chemistry.* ♦3 (First Term, 3-0).
CHEM 657. *Physical Organic Chemistry.* ♦3 (Second Term, 3-0).
CHEM 670. *Advanced Physical Chemistry.* ♦6 (3-0).
CHEM 675. *Magnetic Resonance Spectroscopy.* ♦3 (First Term, 3-0).
CHEM 677. *Physical Chemistry.* ♦3 (First Term, 3-0).
CHEM 679. *Chemical Kinetics.* ♦3 (Second Term, 3-0).
CHEM 683. *Quantum Chemistry.* ♦3 (Second Term, 3-0).
CHEM 685. *Solution Kinetics.* ♦3 (Second Term, 3-0).

## 204.14 / *Civil Engineering*

### 204.14.1 / THE DEGREES OF M.ENG., M.SC., AND PH.D.

(1) The Department of Civil Engineering offers programs leading to the degrees of Doctor of Philosophy, Master of Science and Master of Engineering. Programs are offered in the fields of engineering materials, highways and transportation, hydraulics and hydrology, sanitary engineering, soil mechanics and foundations, structures and solid mechanics.

(2) Doctor of Philosophy programs are offered in the fields of soil mechanics and foundations, hydraulics and hydrology, and structures and solid mechanics. The amount of course work in a Ph.D. program varies depending on the candidate's background.

(3) Master of Science programs normally consist of ten one-term courses or equivalent, five of which must be in the candidate's major field of interest, plus a thesis. Other weightings between course work and thesis may be arranged. A candidate may complete a Master of Science program in twelve months. However, a student is advised to spend two winter sessions, during which he can devote more time to his thesis topic.

(4) Master of Engineering programs consist of ten one-term courses plus a project which is approximately equivalent to a one-term course. A candidate may complete a Master of Engineering program in a minimum of nine months. The minimum residence required is one term for a B.Sc. graduate with at least one year of post B.Sc. experience and one session for a B.Sc. graduate with less than one year of post-B.Sc. experience. The maximum time permitted for completion of a Master of Engineering program is five years from the date of first registration.

(5) Active research areas in the Department include various aspects of: soil mechanics and foundations; transportation engineering and highway materials; concrete and cementitious materials; structural behavior of concrete, steel, and timber members and frames; structural analysis and solid mechanics; hydraulics, hydrology and river behavior; sanitary engineering and pollution control. Details are available on request.

(6) Financial assistance is available, through the Department, in the form of graduate teaching assistantships and research assistantships. Preference is given to Ph.D. and M.Sc. candidates.

(7) Inquiries should be directed to the head of the Civil Engineering Department.

## 204.14.2 / GRADUATE COURSES

CIV E 500. *Civil Engineering Project.* ♦3 (No set hours, credit equivalent to a one-term course). Comprehensive problems in Civil Engineering analysis and/or design; preparation of detailed engineering report.

CIV E 510. *Pavement Design.* ♦3 (First Term, 3-0). Theories and principles of flexible and rigid pavement design and construction control. Pavement performance and evaluation. Instructor: Anderson.

CIV E 511. *Highway Materials.* ♦3 (Second Term, 2-2). Source, manufacture, properties, tests and specifications of bituminous materials. Properties and testing of aggregates, bituminous and other stabilized mixtures. Current research developments. Instructor: Anderson.

CIV E 512. *Transportation Design.* ♦3 (First Term, 3-0). Introduction to all modes of transportation; characteristics of vehicles; road users; geometric design of transportation facilities, including highways, intersections and interchanges, airports, and parking terminals; economics of location. Instructor: Bakker.

CIV E 513. *Transportation Systems Analysis.* ♦3 (Second Term, 3-0). Theory of traffic flow; origin-destination studies; parking studies; mathematical transportation models; simulation; network analysis. Instructor: Bakker.

CIV E 514. *Transportation Engineering.* ♦3 (First or Second Term, 3-0). Traffic capacity of freeways, highways, interchanges and urban roads; transportation capacity of rail, air and seaways; night visibility and illumination; traffic operations and control. Instructor: Bakker.

CIV E 522. *Water and Waste Treatment.* ♦3 (Second Term, 2-4). Chemical, biochemical and biological examination of water and wastes, with emphasis on their interpretation and significance. Instructor: Bouthillier.

CIV E 523. *Sanitary Engineering I.* ♦3 (First Term, 3-0). Physical, chemical, and biological properties and processes related to water and waste water treatment. Instructor: Bouthillier.

CIV E 524. *Sanitary Engineering II.* ♦3 (Second Term, 3-0). Water and waste water quantity and quality requirements. System design. Stream and air pollution indices, assessment and control. Instructor: Bouthillier.

CIV E 528. *Advanced Fluid Mechanics I.* ♦3 (First Term, 3-0). Rigorous physical and hydrodynamic methods applicable to real Newtonian fluids, but excluding advanced wave problems. Instructor: Blench.

CIV E 529. *Advanced Fluid Mechanics II.* ♦3 Second Term, 3-0). Wave problems.

CIV E 531. *Engineering Aspects of Ground Water Hydrology.* ♦3 (First Term, 3-0). Darcy's Law. Permeability. Equations for flow of a compressible liquid through compressible porous media under unsteady conditions. Equilibrium and non-equilibrium well pumping equations. Well testing. Waterlogging. Other selected topics. Instructor: Lennox.

CIV E 532. *Surface Water Hydrology.* ♦3 (Second Term, 3-0). Precipitation. Snow and snow melt. Stream gaging. Unit hydrograph theory. Evaporation. Channel and reservoir routing. Base flow. Statistical analysis. Other selected topics. Instructor: Verschuren.

CIV E 533. *River Engineering I.* ♦3 (Second Term, 3-0). Geomorphology of rivers. River channel processes. Hydraulic resistance of natural channels. Theories of bed stability, channel self-adjustment, and sediment transport. Concepts of river regime. Methods of river survey and analysis. River stabilization and other engineering works. Scour and other common problems. Instructor: Neill.

CIV E 534. *River Engineering II.* ♦3 (either term, 3-0). Outline of engineering problems; quantitative facts of river self-adjustment; development of regime theory from canal observations; applications to steady and unsteady canals; approximate applications to rivers. Elementary model theory. Sediment diversion. Illustrations from case histories. Instructor: Blench.

CIV E 535. *Open Channel Flow I.* ♦3 (First Term, 3-0). Continuity equation; conjugate depths and location of the hydraulic jump for rectangular and non-rectangular sections. Energy of flow; critical conditions; gradually varied flow. Instructor: Peterson.

CIV E 536. *Open Channel Flow II.* ♦3 (Second Term, 3-0). Wave celerity; oscillatory wave; wave routing by analytical and graphical means, for friction, bedslope and changes in cross section. Surge waves. Instructor: Verschuren.

CIV E 537. *Sediment Transport.* ♦3 (First Term, 3-0).

CIV E 538. *Advanced Topics in Fluid Mechanics.* ♦3 (First or Second Term, 3-0). Instructor: Peterson.

CIV E 539. *Hydraulics of Earth Dams and Related Structures.* ♦3 (First Term, 2-2). Spillways; cofferdams; diversion works; seepage; application to design of earth and rock-fill dams and embankments. Instructor: Nuttall.

CIV E 540. *Soil Mechanics and Foundations.* ♦6 (3-0). Plastic and elastic equilibrium; arching; stress-deformation; shear strength; consolidation; earth pressure; application of theory and principles to selection and design of foundations, retaining structures, anchored bulkheads, cofferdams, tunnels, culverts, and bracing of open cuts. Instructor: Sinclair.

CIV E 542. *Advanced Soil Mechanics Problems.* ♦3 (Second Term, 3-0). Case histories illustrating design procedures with, and performance of, heavily over-consolidated, highly sensitive, and peat soils, and recent deep alluvial deposits. Instructor: Hardy.

CIV E 543. *Foundation Engineering.* ♦3 (First Term, 3-0). Consolidation; stress-deformation and shear strength, characteristics; plastic equilibrium; earth pressures; stress distribution; character of natural deposits; application to the selection and design of foundations, buried structures and retaining walls. Note: This course is designed primarily for students majoring in the field of structures.

CIV E 544. *Earth and Rock-Fill Dams.* ♦3 (First Term, 3-0). Stability of slopes, seepage control; earthquake considerations; settlement; mechanism of failures; character of natural deposits; instrumentation; site selection; application to earth and rock-fill dams and embankments.

CIV E 545. *Classification and Control Testing of Soils.* ♦3 (First Term, 2-3). Index and control tests; grain size and plasticity characteristics. Influence of colloids and mineralogy. Moisture content-density relationships; strength and swelling characteristics. Character of natural deposits; subsurface exploration; sampling of soils. Instructor: Thomson.

CIV E 546. *Strength and Volume Characteristics of Soils.* ♦3 (Second Term, 2-3). Consolidation tests. Strength of cohesionless and cohesive soils; stress-deformation properties. Use of various equipment and test techniques.

CIV E 548. *Advanced Topics in Soil Mechanics.* ♦3 (First or Second Term, 3-0).

CIV E 550. *Dimensional Analysis and its Application in Civil Engineering.* ♦3 (First Term, 3-0). Physical statement of problems. Analysis for dimensional homogeneity. Applications to fluid mechanics, soil mechanics, structures. Dynamical similarity. Models. Instructor: Blench.

CIV E 555. *Cement and Concrete Technology.* ♦3 (First or Second Term, 3-0). Properties of plain concrete with emphasis on the physicochemical aspects of behaviour. Instructor: Flower.

CIV E 561. *Plastic Analysis and Design of Structures.* ♦3 (First Term, 3-0). Assumptions and hypotheses. Plastic analysis of beams and frames. Deflections. Local buckling; lateral bracing; axial load effects; beam-columns. Instructors: Adams and Longworth.

CIV E 562. *Behavior and Design of Steel Structures.* ♦3 (Second Term, 3-0). Structural research and theory and their relationship to current specifications and design procedures. Riveted, bolted and welded connections; columns; flexural members; frames. Light gauge construction. Instructor: Longworth.

CIV E 563. *Behaviour and Design of Reinforced Concrete Members.* ♦3 (First Term, 3-0). Strengths and behaviour of simple reinforced concrete members. Relation between results of research and current design specifications. Members subjected to flexure, axial compression, combined flexure and axial load, combined flexure and shear, torsion. Instructor: Warwaruk.

CIV E 564. *Behaviour and Design of Reinforced Concrete Structures.* ♦3 (Second Term, 3-0). Strength and behavior of indeterminate reinforced concrete structures. Load factors. Elastic and limit analysis. Floor slabs. Stability of columns, beams and frames. Instructor: MacGregor.

CIV E 565. *Behavior and Design of Prestressed Concrete Structures.* ♦3 (Second Term, 3-0). Elastic analysis, design and behaviour of simply supported and continuous prestressed concrete beams, frames and slabs. Methods of prestressing; prestress losses; anchorage zone stresses. Discussion of current design specifications. Instructor: Warwaruk.

CIV E 566. *Behavior of Structural Members and Frames.* ♦3 (Second Term, 3-0). Elastic and inelastic stability problems in structural members and frames. Non-uniform torsion of thin walled cross-sections. Equilibrium equations for biaxially loaded beam-columns. Behavior of columns, beams, beam-columns and frames. Instructor: Adams.

CIV E 568. *Advanced Topics in Structural Engineering.* ♦3 (either term, 3-0).

CIV E 569. *Structural Analysis and Design.* ♦3 (Second Term, 3-0). Analysis of beams, arches and slabs. Behavior of steel and concrete structures. Design of slab systems, piers and abutments, retaining walls and bulkheads. Note: This course is designed primarily for students majoring in the fields of Soil Mechanics and Hydraulics.

CIV E 571. *Indeterminate Structural Analysis.* ♦3 (First Term, 3-0). Determinacy and stability criteria. Methods for determining deformations and analysing statically indeterminate structures; emphasis on the similiarities, differences and restrictions of methods. Instructor: Murray.

CIV E 572. *Advanced Structural Analysis.* ♦3 (Second Term, 3-0). Analysis of multi-story, multi-panel building frames. Effects of axial loads on methods of analysis; secondary stresses in trusses; analysis and stability using matrices; finite difference equations; mathematical analogues. Instructor: Simmonds.

CIV E 573. *Analysis and Design of Roof Shells.* ♦3 (Second Term, 3-0). Assumptions, derivations and limitations of shell theories. Recommendations and modifications of theory for design of folded plates, domes, cylindrical vaults, hyperbolic and elliptic paraboloids. Instructor: Simmonds.

CIV E 581. *Turbulent Boundary Layers.* ♦3 (First Term, 3-0). Transition from laminar to turbulent flow. Two dimensional incompressible turbulent boundary layers with and without pressure gradients on smooth and rough walls; axisymmetric cases. Prediction of separation; three dimensional boundary layers. Application to open channel and pipe problems. Instructor: Rajaratnam.

CIV E 582. *Turbulent Jets and Wakes.* ♦3 (Second Term, 3-0). Equation of turbulent jets and wakes. Plane free jet boundary problem. Plane and axisymmetric free jets. Plane wall jets. Plane and axisymmetric wakes. Applications to relevant engineering problems. Instructor: Rajaratnam.

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## 204.15 / *Classics*

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### 204.15.1 / THE DEGREE OF M.A.

(1) The Department offers graduate work leading to the Master's degree in three main fields: in Classics, including languages literatures, Ancient History and Archaeology; in Latin; and in Greek. Programs in Latin or Greek and a modern language may be arranged through the Committee of Comparative Literature or the Department of General Linguistics.

(2) The Department and the University are, through the kindness of the Andrew Agrios Memorial Fund, associated institutions of the American School of Classical Studies at Athens. The Department is also the holder of a collection of antiquities a part of which is on permanent loan from the Royal Ontario Museum of Archaeology and the Norton collection. It also possesses a collection of Roman Imperial coins for numismatic study.

(3) The total work of a student with an honors B.A. in Classics (or its equivalent) will normally consist of three courses at the 500 to 600 level in the Department, a thesis appropriate to the major field, an oral defence of the thesis, and a level of competence in Greek or Latin prose composition to the satisfaction of the department. The student will spend a minimum of one year in residence.

(4) The total work for a student from a general undergraduate program will consist of at least seven courses, five of which must be at the 500 to 600 level, a thesis, an oral defence and a level of competence in Greek or Latin prose composition to the satisfaction of the Department. There must be a total in B.A. and M.A. work of at least eleven courses in Latin and Greek, with a minimum of three courses in the secondary language.

(5) Demonstrated proficiency (to the satisfaction of the Department) in French, German, or Italian is required before any master's degree will be awarded.

(6) A limited amount of financial assistance for graduate students is available. Applications should be received by the head of the Department by March 1.

### 204.15.2 / GRADUATE COURSES

*Greek*

GREEK 501. *Plato and Aristotle.* ♦6 (3-0).
GREEK 502. *Homer, Iliad.* ♦6 (3-0).
GREEK 503. *Greek Lyric Poetry.* ♦6 (3-0).
GREEK 505. *Greek Comedy.* ♦6 (3-0).
GREEK 506. *Greek Orators.* ♦6 (3-0).
GREEK 507. *Greek Tragedy.* ♦6 (3-0).
GREEK 508. *Thucydides.* ♦6 (3-0).
GREEK 509. *Hellenistic Poetry.* ♦6 (3-0).
GREEK 511. *Advanced Greek Prose Composition.* ♦2 (1-0).
GREEK 517. *Studies in Greek Literature.* ♦6 (3-0).
GREEK 518. *Readings in Hellenistic History.* ♦6 (3-0).
GREEK 519. *Readings in Greek History.* ♦6 (3-0).
GREEK 521. *History of the Greek Language.* ♦3 (either term, 3-0).
GREEK 522. *Greek Epigraphy.* ♦3 (either term, 3-0).
GREEK 620. *The Greek and Latin Epigrams.* ♦6 (3-0).

*Latin*

LATIN 501. *Cicero.* ♦6 (3-0).
LATIN 502. *Roman Comedy.* ♦6 (3-0).
LATIN 503. *Epic and Didactic Poetry.* ♦6 (3-0).
LATIN 505. *Virgil, Complete Works.* ♦6 (3-0).
LATIN 506. *Sanskrit.* ♦6 (3-0).
LATIN 507. *Petronius, Apuleius.* ♦6 (3-0).
LATIN 508. *Tacitus.* ♦6 (3-0).
LATIN 509. *Roman Elegiac Poets.* ♦6 (3-0).
LATIN 510. *Roman Satire.* ♦6 (3-0).
LATIN 511. *Advanced Latin Prose Composition.* ♦2 (1-0).
LATIN 513. *Latin Lyric Poetry.* ♦6 (3-0).
LATIN 517. *Studies in Latin Literature.* ♦6 (3-0).
LATIN 531. *History of the Latin Language.* ♦3 (either term, 3-0).
LATIN 532. *Latin Epigraphy.* ♦3 (either term, 3-0).
LATIN 533. *Latin Paleography.* ♦3 (either term, 3-0).
LATIN 534. *Medieval Latin.* ♦3 (either term, 3-0).

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## 204.16 / *Community Development*

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### 204.16.1 / THE DEGREE OF M.A.

(1) The administration of a program leading toward an M.A. in Community Development is under the supervision of an interdepartmental committee responsible to the Dean of Graduate Studies. It consists of representatives of the Departments of Agricultural Economics, Anthropology, Economics, Extension, Geography, Recreation, Community Medicine, Political Science, Psychology, Sociology, the Faculty of Education and the School of Household Economics. To administer the day-to-day operation of the program an executive committee consisting of the chairman, the secretary, and three other members of the larger committee has been appointed.

(2) Candidates taking this program must have a general background in the social sciences and especially a 400-level proficiency in Economics, Sociology, and Social Psychology. It is expected that most candidates for this degree will be required to take an initial qualifying year during which the prerequisites in the social sciences will be obtained. Where required, the executive committee administering the program will work out with the student, primarily from undergraduate courses offered by members of the appropriate faculties, the content of the qualifying year. Students may be admitted directly to the graduate year if their background in the required subjects is considered adequate.

(3) A four-month field internship, arranged and supervised by the executive committee, will be required of all students, unless the student's previous work experience is judged to be sufficiently relevant.

(4) In the graduate year the student will be required to take the interdisciplinary seminar in Community Development (600-level, see below), a seminar in Sociology (500-level) an Adult Education seminar (500-level), and an optional 500-level course or seminar. Optional seminars or courses can be selected from calendar listings in the following fields: Social Psychology, Sociology, Economics, Agricultural Economics, Rural Sociology, Anthropology, Political Science, Education, Adult Education, Geography, and Recreation.

(5) For additional information regarding this program, including the availability of assistantships or other financial assistance, students should contact the Secretary of the Community Development M.A. Committee, c/o the Department of Agricultural Economics, The University of Alberta, Edmonton. Such inquiries should be made as early as possible, particularly by students who wish to begin acquiring the necessary prerequisites by taking Summer School courses.

### 204.16.2 / GRADUATE COURSE

SOC 600. *Community Development.* ♦6. A seminar designed to provide a thorough appreciation of the wide interdisciplinary scope of community development through reading and through discussion with theorists and actual practitioners engaged in community development projects.

# 204.17 / *Community Medicine (Health Services Administration)*

## 204.17.1 / THE DEGREE OF MASTER OF HEALTH SERVICES ADMINISTRATION

(1) The Division of Health Services Administration of the Department of Community Medicine offers the degree of Master of Health Services Administration with major fields of concentration in hospital administration, medical care administration, and public health administration.

(2) The hospital administration major will most effectively prepare persons for senior administrative positions in general and special hospitals. The medical care administration major will prepare persons for administrative positions primarily involving purely medical services and personnel—it will be relevant to such positions as Director of Ambulatory Care Services, Assistant Directors (Medical) of major hospitals, senior executives in government and voluntary medical insurance agencies, and so on. The public health administration major will prepare persons for health services administration activities in local, provincial and federal health departments.

(3) The requirements for admission are:

(i) a baccalaureate degree with an average mark of at least 65% in the work of the last two years;

(ii) a statement from the head of the department concerned to the effect that the applicant is, in all respects, acceptable to the department.

(4) The assumptions reflected in the curriculum are that there is a core of material common to all administrative roles in health services agencies; that there is material directly and specifically relevant to the administrative roles in the public health, medical care, and hospital sectors of the health care industry; and that a variety of other materials are of value and use to the student, depending on his background and career interests. Following these assumptions, the core classes will deal primarily with the social, economic and political aspects of health care in Canada and with the application of social science theory and methods to the task of administering a health service agency. Classes in the area of concentration will focus specifically on the structure, function, and administrative problems relevant to the student's specific interest (hospitals, public health, or medical care). Finally, a variety of electives will be offered by the Division and the student may also choose electives from other departments of the University. Examples of the electives offered by the Division of Health Services Administration are Managerial Accounting, Financial Management, Health Care Economics, Quantitative Techniques (including probability statistics, computer utilization, work study, and systems analysis in a sequence of four classes), and Epidemiology.

(5) The program will require a minimum of twenty-one months study, research, and externship experience. The initial academic year will extend from mid-September until late April with May and June free for thesis completion. In the case of hospital administration students, permission may be granted for the student to opt out of the majority of intra-mural academic activities in January of the second year and proceed with a six-month, in-hospital residency.

(6) The normal course load will require from nine to twelve hours a week of classroom work.

(7) Further information may be obtained from the Co-ordinator, Division of Health Services Administration, Department of Community Medicine.

## 204.17.2 / GRADUATE COURSES

HSA 400. *Health Care Systems.* ♦6 (3-0). The development of the Canadian health care system and of its contemporary and emergent structure, functions, and problems. Emphasis on the nature of demand for health care, government involvement in health care, professional prerogatives and norms, and the health care system of the future. The Canadian health care system compared with others.

HSA 410. *Hospital Administration.* ♦6 (3-0). The historical, contemporary, and emergent structure, functions, and problems of the hospital as a community health resource. Lectures and field trips.

HSA 411. *Medical Care Administration.* ♦6 (3-0). The development of modalities for the delivery of medical care and of their contemporary and emergent structure, functions, and problems. Lectures and field trips.

HSA 412. *Public Health Administration.* ♦6 (3-2s). The development of public health service and of its contemporary and emergent structure, functions, and problems. The principles, as applied in public health practice, of nutrition, occupational health, sanitation, and health education. Lectures and field trips.

HSA 450. *Health Services Accounting.* ♦3 (First Term). An introduction to managerial accounting in the context of health service agencies. The special problems of cost-benefit analysis and of cost control in health service organizations.

HSA 460. *Electronic Data Processing and Computer Utilization for Health Service Administrators.* ♦3 (First Term, 3-0). The utilization of electronic data processing and computer equipment in health service agencies. Topics will include the principles of data processing, the fundamentals of programming language, and applications to administrative and research decisions.

HSA 470. *Introductory Health Care Economics.* ♦3 (First Term, 3-0). The dynamics of demand and supply in the medical marketplace and a review of the economic factors influencing price and output of health services.

HSA 510. *Special Seminar in Health Services Administration.* ♦4 (0-2). Special topics, such as forensic medicine, techniques of planning and controlling construction programs, institutional and professional accreditation programs, etc.

HSA 520. *Principles of Health Service Administration.* ♦6 (3-0). The application of social science theory, method, and research findings to the administration and management of health service agencies. Emphasis on such issues as professional-bureaucratic dilemmas, the nature of health service ownership, and the difficulties inherent in goal definition and measurement of health service agencies.

HSA 530. *Statistics for Health Service Administration.* ♦3 (First Term, 3-0). A survey of basic vital, epidemiological, and probability statistics as applied to administrative planning, research, and problem solving in health service agencies.

HSA 535. *Epidemiology.* ♦3 (Second Term, 3-0). The distribution of disease in populations and the factors which influence this. The natural history of selected diseases, and how epidemiological methods can be used in their prevention and control.

HSA 550. *Health Service Finance.* ♦3 (Second Term, 3-0). Cost accounting and budget applications in health service agencies. Methods of formulating and implementing organization policy in the context of contemporary health care financial structures and policies.

HSA 560. *Work Study and System Analysis.* ♦3 (Second Term, 3-0). An introduction to the principles of work study and system analysis, and their applications in health service agencies. Topics will include health service demand estimation and projection, resource allocation, and quality measurement and control.

HSA 570. *Health Care Economics.* ♦3 (Second Term, 3-0). Methods of allocating resources to the health care sector of the economy. The role of individuals and organizations in the decision process.

HSA 600. *Advanced Seminar in Health Services Administration.* ♦6 (0-3). Preparation of a major paper dealing with a significant issue or problem in health services administration. Faculty, practising experts, and community facilities will be used in planning the project, collecting data, and criticizing the final presentation.

## 204.18 / *Comparative Literature*

### 204.18.1 / THE DEGREES OF M.A. AND PH.D.

(1) Graduate programs in Comparative Literature are arranged and administered by an Interdepartmental Committee comprising members from the Departments of Classics, English, Germanic Languages and Literature, Romance Languages and Literature, and Slavonic Languages and Literature.

(2) Programs leading to the degrees of Master of Arts and Doctor of Philosophy can be undertaken in all literatures taught at the University.

(3) Applicants for graduate work in Comparative Literature should, in their previous programs, have concentrated on the literature of one or two languages (combined honors). They must have a competent reading knowledge of at least one language other than English in order to undertake an M.A. program, and of at least two languages other than English in order to undertake a Ph.D. program.

(4) In addition to the dissertation, four courses are normally required for an M.A. and six additional courses for a Ph.D. Half of the courses should be in Comparative Literature. The number of courses and their areas shall, however, be determined individually. The Ph.D. candidacy examination consists of three written parts and the oral.

(5) A candidate for the M.A. entering from a four-year specialized program and continuing work in the same field, is normally required to complete the equivalent of one calendar year's work. Other candidates are normally required to complete the equivalent of two years' work.

(6) The time necessary to complete the requirements for the Ph.D. depends upon the student's progress. For a student with a B.A., the minimum requirement is three academic years of study and research, of which two academic years must be in residence at The University of Alberta. For a student with an M.A., the minimum requirement is two years of study and research in residence at The University of Alberta. Details are determined by the Interdepartmental Committee, and an alternative method of meeting the residence requirement may be considered on recommendation of the Committee to the Faculty of Graduate Studies.

(7) Graduate teaching assistantships (in the Departments sponsoring the Comparative Literature program), graduate service assistantships, graduate research assistantships, scholarships, fellowships, and bursaries are available to qualified students. For details, see the Awards section of the Calendar.

(8) Inquiries concerning academic programs should be addressed to the chairman of the Committee.

### 204.18.2 / GRADUATE COURSES

C LIT 505. *The Theory of the Study of Literature.* ♦6 (3-0).

C LIT 507. *Literary Stylistics.* ♦6 (3-0).

C LIT 510. *Poetics: The Nature and Forms of Poetry.* ♦6 (3-0).

C LIT 515. *Studies in Folklore.* ♦6 (3-0).

C LIT 517. *The Greek and Latin Tradition in European Literature.* ♦6 (3-0).

C LIT 520. *Comparative Studies in Medieval Literature.* ♦6 (3-0).

C LIT 528. *Comparative Studies in the Renaissance and Baroque Literature of Italy, Spain and France.* ♦6 (3-0).
C LIT 530. *Comparative Studies in European Drama of the Sixteenth and Seventeenth Centuries.* ♦6 (3-0).
C LIT 550. *Comparative Studies in Romantic Literature.* ♦6 (3-0).
C LIT 555. *Comparative Studies in Literature of the Late Nineteenth Century.* ♦6 (3-0).
C LIT 620. *Comparative Slavonic Literature.* ♦6 (3-0).
C LIT 640. *Socialist Realism: Theory and Practice.* ♦6 (3-0).
C LIT 648. *Comparative Studies in French and English Literature, 1830-1900.* ♦6 (3-0).
C LIT 649. *Franco-German Literary Relations during the Nineteenth Century.* ♦6 (3-0).
C LIT 695. *Anglo-German Literary Relations from the Sixteenth to the Nineteenth Century.* ♦6 (3-0).

## 204.19 / *Computing Science*

### 204.19.1 / THE DEGREE OF M.SC.

(1) The Department offers graduate programs leading to the Master of Science degree.

(2) There are research programs in artificial intelligence, computer assisted instruction, graphical communication, information retrieval, numerical analysis, programming systems and languages, simulation studies, statistical analysis, time-sharing and on-line systems. The Department operates an IBM360/67 and an IBM1500.

(3) The degree requirements for candidates with an Honors Computing Science degree or equivalent may be completed in a minimum of one full year. Candidates from a different discipline, such as engineering, will require two years because of the background in computing science and mathematics that would likely need to be supplemented.

(4) The requirements for the one year degree are three graduate courses and a thesis.

(5) Financial assistance is available throughout the calendar year in the form of teaching assistantships (eight months), summer assistantships (four months) and research assistantships (twelve months).

(6) Further information may be obtained from the Department head.

### 204.19.2 / UNDERGRADUATE COURSES

The following may be taken for graduate credit:

CMPUT 411. *Computer Languages and Their Processors.* ♦6 (3-0).
CMPUT 460. *Numerical Analysis.* ♦6 (3-0).
CMPUT 461. *The Structure of Digital Machines.* ♦6 (3-0).

### 204.19.3 / GRADUATE COURSES

CMPUT 511. *Computer Graphics.* ♦3 (either term, 3-0).
CMPUT 540. *Linear Programming.* ♦6 (3-0).
CMPUT 550. *Artificial Intelligence.* ♦3 (3-0).
CMPUT 560. *Fundamentals of Information Retrieval.* ♦6 (3-0).
CMPUT 561. *Computing Systems.* ♦6 (3-0).
CMPUT 570. *Introduction to Automata Theory.* ♦6 (3-0).
CMPUT 640. *Advanced Numerical Analysis.* ♦6 (3-0).
CMPUT 650. *Advanced Topics in Computing Science.* ♦6 (3-0).

## 204.20 / *Dentistry*

### 204.20.1 / THE DEGREE OF M.SC.

(1) The Faculty of Dentistry has research laboratories and instructional facilities for a limited number of graduate students proceeding to the Master of Science degree.

(2) The active research interests of the staff include: *Anatomy*—growth and development; calcification and decalcification; mammalian cell and organ culture; *Biochemistry*—absorption and metabolism of calcium and phosphorus; glycoproteins and iron metabolism of tumor-bearing animals; enzymes of the gastrointestinal tract; *Microbiology*—animal cell culture; virology; bacteriology; immunology; *Dental Public Health and Epidemiology*—growth patterns of young children; fluoride intake; topical fluoride; administration of public health programs; *Clinical Dentistry*—pediatric dentistry including interceptive orthodontics and treatment for handicapped children.

(3) Dental graduates may undertake graduate programs in either basic science or clinical science. Students without dental qualifications, but who hold a B.Sc. degree in biological or physical science are eligible for graduate work in the division of basic research in dentistry.

(4) Fellowships and assistantships are available. Applications may be submitted to the Dean of the Faculty of Dentistry at any time throughout the year.

### 204.20.2 / GRADUATE COURSES

DENT 500. *Cephalometrics.* ♦6 (1-3). Prerequisite: Permission of the Department.
DENT 501. *Advanced Pedodontics.* ♦6 (1-6). Prerequisite: Permission of the Department.
DENT 502. *Advanced Oral Pathology.* ♦2 (Second Term, 1-2). Techniques for obtaining and preserving specimens for pathological examination, the interpretation of pathological reports, and the pathology of some of the rarer oral lesions. K. A. McMurchy and Staff.
DENT 503. *Mineralization in Biological Systems.* ♦3 (First Term, 3-0). The developmental morphology and the chemical nature of the protein and

mineral phases of calcified tissues in man and animals. Particular emphasis on calcification and decalcification of teeth and bones.

## 204.21 / *Drama*

### 204.21.1 / GENERAL INFORMATION

(1) The Department offers graduate programs leading to the Master of Fine Arts degree in Design or in Directing and to the Master of Arts degree in Dramatic Literature, Theatre History, or Dramatic Theory and Criticism.

(2) The Department provides one fully-equipped Studio Theatre and one experimental theatre as dramatic arts laboratories available to graduate students. One workshop each for costume design and set design serves graduate designers. The theatre collection in the library is extensive; it offers particular opportunities for work in Expressionism, Canadian Theatre, German Drama, French and Spanish Drama.

(3) Graduate Teaching Assistantships of $1,800 to $3,000 plus travel allowance are available to qualified students. In addition summer assistantships to the value of $1,000 are available for selected candidates for work on thesis projects.

(4) Inquiries should be addressed to the Chairman, Graduate Division, Department of Drama.

### 204.21.2 / THE DEGREE OF M.F.A.

(1) A candidate must hold a Bachelor's degree (or its equivalent) from a recognized institution.

(2) To be accepted, the candidate must demonstrate to the Department his mastery of the fundamentals of the three artistic components of theatre art: acting, design and directing, as well as sufficient preparation in theatre history and criticism. The candidate must either hold the B.F.A. degree in design or directing or have reached a level equivalent to this degree.

(3) Candidates who do not hold a B.F.A. degree in directing or design (or its equivalent) will be required to pass a set of placement examinations before they are accepted. These examinations are prepared by the Department.

(4) Accepted candidates will normally complete their course work within one academic year. The creative project, part of the thesis requirement, will normally be scheduled for presentation during the year following the completion of course work.

(5) Candidates coming from a three-year undergraduate program and/or those who need to make up prerequisite training (as a result of placement examinations) will normally spend one additional year in preparation.

(6) All candidates must take: Drama 600, Drama 610, and either Drama 670 or Drama 680.

(7) Candidates must present an acceptable thesis, combining a creative project and a related historical or critical study; they must defend their thesis orally.

### 204.21.3 / THE DEGREE OF M.A.

(1) A candidate must hold a Bachelor's degree (or its equivalent) from a recognized institution.

(2) To be accepted, the candidate must demonstrate to the Department his mastery of the fundamentals of the three artistic components of theatre art: acting, design, and directing, as well as sufficient preparation in theatre history and criticism.

(3) Accepted candidates will normally complete their course work and thesis within one academic year.

(4) Candidates coming from a three-year undergraduate program and/or those who need to make up prerequisite training will normally spend one additional year in preparation.

(5) All candidates will take: Drama 600, Drama 610 and one graduate course in their area of specialization.

(6) Candidates must pass a comprehensive examination. They must present an acceptable research thesis and defend it orally.

(7) Candidates must demonstrate a reading knowledge of one approved language other than English.

### 204.21.4 / GRADUATE COURSES

DRAMA 600. *Methods and Tools of Research.* ♦6 (3-0).
DRAMA 602. *Seminar in Dramatic Theory and Criticism.* ♦6 (3-0).
DRAMA 603. *Research in Dramatic Literature.* ♦6 (3-0).
DRAMA 604. *Research in Theatre History.* ♦6 (3-0).
DRAMA 610. *Applied Criticism.* ♦6 (3-0).
DRAMA 670. *Styles in Design.* ♦6 (6L). Note: M.F.A. program only.
DRAMA 680. *Styles in Directing.* ♦6 (6L). Note: M.F.A. program only.

## 204.22 / *Economics*

### 204.22.1 / THE DEGREES OF M.A. AND PH.D.

(1) The Department of Economics offers programs leading to the Master of Arts and Doctor of Philosophy degrees.

(2) Students entering the graduate program are required to have or to make up

credit in a basic course in Calculus and one in Statistics in addition to their normal graduate program.

(3) All applications for admission received by March 31 are considered in awarding departmental teaching and research assistantships. Details of scholarships and other financial assistance available are included in the Awards section of this Calendar.

(4) Inquiries regarding details of programs offered within the department should be directed to the head of the Department.

### 204.22.2 / GRADUATE COURSES

ECON 503. *Microeconomic Theory I.* ♦3 (First Term, 3-0).
ECON 505. *Microeconomic Theory II.* ♦3 (Second Term, 3-0).
ECON 506. *Mathematical Economics.* ♦6 (3-0).
ECON 507. *Econometrics I.* ♦3 (First Term, 3-0).
ECON 508. *Econometrics II.* ♦3 (Second Term, 3-0).
ECON 510. *Economics of Underdeveloped Countries.* ♦6 (3-0).
ECON 511. *Economic Development of Canada.* ♦6 (3-0).
ECON 521. *The Pure Theory of International Trade.* ♦3 (First Term, 3-0).
ECON 522. *International Monetary Economics.* ♦3 (Second Term, 3-0).
ECON 530. *Labor Economics.* ♦6 (3-0).
ECON 540. *Monetary Theory.* ♦3 (either term, 3-0).
ECON 550. *The Public Sector of the Economy.* ♦3 (First Term, 3-0).
ECON 551. *Intergovernmental Fiscal Relations.* ♦3 (Second Term, 3-0).
ECON 552. *Urban Economics.* ♦3 (either term, 3-0).
ECON 560. *Agriculture in Developing Countries.* ♦3 (First Term, 3-0).
ECON 564. *Regional Economic Analysis.* ♦3 (First Term, 3-0).
ECON 565. *Economics and Management of Natural Resources.* ♦3 (Second Term, 3-0).
ECON 572. *Industrial Organization.* ♦6 (3-0).
ECON 581. *Macroeconomics I.* ♦3 (First Term, 3-0).
ECON 582. *Macroeconomics II.* ♦3 (Second Term, 3-0).
ECON 585. *Theory of Economic Policy.* ♦3 (either term, 3-0).
ECON 591. *Comparative Economic Systems I.* ♦3 (First Term, 3-0).
ECON 592. *Comparative Economic Systems II.* ♦3 (Second Term, 3-0).
ECON 598. *Statistical Methods for Economists.* ♦3 (First Term, 3-2).
ECON 599. *Economic Statistics.* ♦3 (either term, 3-0).
ECON 601. *Seminar in Microeconomic Theory I.* ♦3 (First Term, 3s-0).
ECON 602. *Seminar in Microeconomic Theory II.* ♦3 (Second Term, 3s-0).
ECON 607. *Advanced Mathematical Economics.* ♦3 (First Term, 3s-0).
ECON 608. *Advanced Econometrics.* ♦3 (Second Term, 3s-0).
ECON 611. *Economic Development.* ♦6 (3-0).
ECON 620. *International Economics.* ♦3 (First Term, 3-0).
ECON 622. *Special Topics in International Economics.* ♦3 (Second Term, 3-0).
ECON 630. *Labor Theory: an Integration.* ♦3 (First Term, 3s-0).
ECON 632. *Manpower Resources and Allocation.* ♦3 (Second Term, 3s-0).
ECON 640. *Monetary Economics.* ♦3 (either term, 3s-0).
ECON 661. *Agricultural Economics.* ♦6 (3-0).
ECON 671. *Business and Government.* ♦6 (3-0).
ECON 681. *Advanced Macroeconomic Theory I.* ♦3 (First Term, 3-0).
ECON 682. *Advanced Macroeconomic Theory II.* ♦3 (Second Term, 3-0).
ECON 685. *Theory of Economic Policy.* ♦3 (either term, 3s-0).
ECON 693. *Topics in Comparative Economics I.* ♦3 (First Term, 3-0).
ECON 694. *Topics in Comparative Economics II.* ♦3 (Second Term, 3-0).
ECON 695. *Topics in Soviet Economy I.* ♦3 (First Term, 3-0).
ECON 696. *Topics in Soviet Economy II.* ♦3 (Second Term, 3-0).

## 204.23 / *Educational Administration*

### 204.23.1 / THE DEGREES OF M.ED., ED.D., AND PH.D.

(1) Students who satisfy the admission requirements of the Faculty of Graduate Studies and who have the approval of the Department of Educational Administration may pursue programs of study and research leading to the degrees of M.Ed., Ed.D., and Ph.D.

(2) The Department of Educational Administration offers graduate instruction in a variety of programs in school administration. More particularly these programs are designed to assist students to prepare to serve as principals, superintendents of schools, and central administration officers, officers of provincial departments of education, and as professors of educational administration.

(3) The Department makes special arrangements with public school systems and provincial departments of education so that facilities are available for student observation, research, participation in field projects and internships. The research facilities provided through the Alberta Advisory Committee on Educational Research, sponsored jointly by the Faculty of Education, the Department of Education, the Alberta School Trustees' Association, The Alberta Teachers' Association, and the Alberta Federation of Home and School Associations, are available to graduate students in this Department. The *Alberta Journal of Educational Research* published under supervision of the Faculty is the official outlet for reports of research sponsored by the Alberta Committee on Educational Research.

(4) A number of fellowships and assistantships in teaching and research are available for well-qualified candidates.

(5) Prospective students should consult the head of the Department for further information on the program and admission requirements.

### 204.23.2 / GRADUATE COURSES

ED ADM 500. *Research Seminar.* Non-credit. Hours to be arranged.
ED ADM 510. *Research Design and Data Analysis.* ♦6 (3-1).
ED ADM 525. *Administration of Educational Personnel.* ♦3 (either term, 3-0).
ED ADM 559. *Administration of Public Education in Canada.* ♦3 (either term, 3-0).
ED ADM 561. *Evolving Concepts in Educational Administration.* ♦3 (First Term, 3-0).
ED ADM 563. *Administration of the Educational Program.* ♦3 (either term, 3-0).
ED ADM 565. *Educational Finance.* ♦3 (First Term, 3-0).

NOTE: Full-year courses corresponding to the above five half-year courses (525, 559, 561, 563, and 565) are designated ED ADM 526, 560, 562, 564, and 566 respectively and are normally offered only in the summer session.

ED ADM 610. *Advanced Research Design and Data Analysis.*
ED ADM 626. *Administrative Behavior.*
ED ADM 660. *The Social and Political Environment.*
ED ADM 662. *Organization Theory.*
ED ADM 664. *The Problems of Educational Administration.*
ED ADM 666. *Education Finance.*
ED ADM 670. *The Development and Administration of Higher Education.*

NOTE: Courses numbered in the 600's are conference courses in which credit is given according to work done, to a maximum of six hours.

## 204.24 / *Educational Foundations*

### 204.24.1 / THE DEGREES OF M.ED. AND PH.D.

(1) The Department offers programs leading to the M.Ed. and Ph.D. degrees. Candidates may specialize in one of the following fields: history of education, sociology of education, philosophy of education, comparative education, and intercultural education.

(2) Graduate programs normally include related courses offered by departments of the Faculty of Arts and other departments of the Faculty of Education.

(3) A number of teaching, service, and research assistantships are available to well-qualified candidates.

(4) Inquiries concerning admission, programs, and assistantships should be directed to the head of the Department.

### 204.24.2 / GRADUATE COURSES

ED FDN 500. *Education Seminar.* Non-credit: hours to be arranged.
ED FDN 502. *Conference Course on Selected Topics.* ♦6 (3-0).
ED FDN 513. *Development and Theory of Sociology of Education.* ♦3 (either term, 3-0).
ED FDN 515. *Contemporary Issues and Research in Sociology of Education.* ♦3 (either term, 3-0).
ED FDN 526. *Anthropological Theory and Education.* ♦6 (3-0).
ED FDN 531. *Philosophical Analysis of Teaching.* ♦3 (either term, 3-0).
ED FDN 532. *Philosophical Foundations of Educational Research.* ♦6 (3-0).
INTER D 546. *Soviet and East European Studies: An Interdisciplinary Seminar.* ♦6 (3-0).
ED FDN 571. *Studies of Educational Change in Western Nations.* ♦3 (either term, 3-0).
ED FDN 573. *Functions of Education in the Development of Emerging Nations.* ♦3 (either term, 3-0).
ED FDN 581. *History of Education in Western Europe Before 1900.* ♦3 (either term, 3-0).
ED FDN 583. *History of Education in the United States Before 1900.* ♦3 (either term, 3-0).
ED FDN 587. *History of Education in Western Canada.* ♦3 (either term, 3-0).
ED FDN 587. *History of Education in Eastern Canada.* ♦3 (either term, 3-0).
ED FDN 589. *History of Education: Method and Structure.* ♦3 (either term, 3-0).
ED FDN 592. *Philosophy of Education.* ♦6 (3-0).
ED FDN 602. *Conference Course on Selected Topics.* ♦ varies from 3 to 6.

## 204.25 / *Educational Psychology*

### 204.25.1 / THE DEGREES OF M.ED., ED.D., AND PH.D.

(1) The Department offers the M.Ed., Ed.D., and Ph.D. in the fields of developmental psychology, the psychology of learning, measurement and research design, counselling and guidance, school psychology and the psychology of exceptional children.

(2) In addition to the general requirements for graduate study, students planning specialization in Measurement, School Psychology, and Counselling Psychology are expected to offer Educational Psychology 487, *The Measurement of Educational Objectives* or its equivalent.

(3) In addition to completing a thesis, all candidates for the master's degree are required to demonstrate competence in research methods, personality theory, developmental psychology, learning theory and group processes. The required level of competence may be demonstrated by (i) successful completion of any or all of the following courses: Educational Psychology 502, 515, 517, 569, and 571; or (ii) by offering credit in approved equivalents; or (iii) by independent study and special examination.

(4) Normally the completion of the master's requires two years, at least one of which must be in residence. The doctoral degree normally requires two years beyond the master's.

(5) The Department offers financial support in the form of Graduate Teaching Assistantships and, through the Faculty of Graduate Studies, Graduate Service and Research Assistantships are available.

(6) Initial inquiries about the Department's programs and about assistantships should be addressed to the Head, Department of Educational Psychology. Formal application for admittance should be directed to the Faculty of Graduate Studies. Since enrolment is limited in some programs of the Department, applicants are advised to initiate their applications well before August 31 (for the Winter Session) and April 1 (for the Summer Session).

### 204.25.2 / GRADUATE COURSES

ED PSY 500. *Education Seminar* — Reports by staff and graduate students. No course credit given.
ED PSY 502. *Introduction to Educational Research.* ♦6 (3-1).
ED PSY 504. *Statistics and Research Design in Education.* ♦6 (3-1). Prerequisite: ED PSY 502 or equivalent.
ED PSY 511. *Vocational Development and Choice.* ♦3 (3-0).
ED PSY 512. *Seminar and Practicum in Individual Counselling.* ♦6 (3-3). Prerequisite or corequisite: ED PSY 515 or equivalent and consent of the Department.
ED PSY 513. *Group Assessment in Guidance and Counselling.* ♦3 (3-1). Prerequisite: ED PSY 487 or equivalent.
ED PSY 515. *Theories of Personality.* ♦3 (3-0).
ED PSY 517. *Group Processes in the School.* ♦3 (3-0).
ED PSY 518. *Seminar and Practicum in Group Counselling.* ♦6 (3-3). Prerequisites: ED PSY 512, ED PSY 517, and consent of the Department.
ED PSY 519. *Seminar in Elementary School Counselling.* ♦3 (3-0).
ED PSY 520. *Seminar and Practicum in School Psychology.* ♦6 (3-3). Prerequisite: ED PSY 524 or equivalent and consent of the Department.
ED PSY 524. *Individual Diagnosis in School Psychology.* ♦6 (3-3). Prerequisite: consent of the Department.
ED PSY 548. *Psychology and Education of Exceptional Children.* ♦6 (3-1). Course for teachers of exceptional children and personnel serving in supervisory roles in special education.
ED PSY 550. *Psychology and Education of Hearing Handicapped Children.* ♦6 (3-1).
ED PSY 552. *Psychology and Education of Mentally Retarded Children.* ♦6 (3-1).
ED PSY 554. *Psychology and Education of Gifted Children.* ♦6 (3-1).
ED PSY 556. *Psychology and Education of Physically Handicapped Children.* ♦6 (3-1).
ED PSY 558. *Psychology and Education of Emotionally Disturbed and Socially Maladjusted Children.* ♦6 (3-1).
ED PSY 560. *Seminar and Research in Developmental Psychology.* ♦6 (3-3). Prerequisite: ED PSY 569 or equivalent and consent of the Department.
ED PSY 562. *Educational Psychology in the Soviet Union and Eastern Europe.* ♦6 (3-0). Prerequisite: consent of the Department.
ED PSY 568. *Seminar and Research in Learning.* ♦6 (3-3). Prerequisite: ED PSY 571 or equivalent and consent of the Department.
ED PSY 569. *Advanced Educational Psychology: Development.* ♦3 (3-0).
ED PSY 571. *Advanced Educational Psychology: Learning.* ♦3 (3-0).
ED PSY 580. *Seminar and Research in Educational Measurement.* ♦6 (3-3). Prerequisites: ED PSY 487 and 502 or equivalents.
ED PSY 592. *Seminar and Research in the Social Psychology of School and Classroom.* ♦6 (3-3). Prerequisites: ED PSY 502 and 517 or equivalents.
ED PSY 597. *Special Seminars.* ♦3 (3-0). Prerequisite: consent of the Department.
ED PSY 598. *Special Seminars.* ♦6 (3-0). Prerequisite: consent of the Department.
ED PSY 599. *Individual Directed Reading and Research.* ♦3 (3-0). Prerequisite: consent of the Department.
ED PSY 610. *Guidance and Counselling.* ♦6.
ED PSY 620. *Personality, Affect, and Cognition.* ♦6.
ED PSY 630. *School Psychology.* ♦6.
ED PSY 640. *Special Education.* ♦6.
ED PSY 660. *Developmental Psychology.* ♦6.
ED PSY 676. *Psychology of Learning.* ♦6.
ED PSY 680. *Educational Measurement.* ♦6.

## 204.26 / *Electrical Engineering*

### 204.26.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Electrical Engineering offers postgraduate courses, leading to the M.Eng., M.Sc., and Ph.D. degrees, to qualified graduates of recognized universities.

(2) Considerable research facilities are available in a number of areas, notably biomedical engineering, nonlinear, sample data, and optimal control systems, high voltage, lasers, microwave semiconductor devices, microwave communications, microwave power, particle accelerators, plasmas, space research, power systems and ultra-high vacua and surface phenomena.

(3) A normal requirement for the M.Sc. degree is eight graduate half-courses, at least two of which should be taken outside of the Department, and a short thesis.

(4) Master of Engineering programs consist of ten half-courses plus a project which is approximately equivalent to a half-course. A candidate may complete a Master of Engineering program in a minimum of nine months. The minimum residence required is one term for a B.Sc. graduate with at least one year of post-B.Sc. experience and one session for a B.Sc. graduate with less than one year of post-B.Sc. experience. The maximum time permitted for completion of a Master of Engineering program is five years from the date of first registration.

(5) For the Ph.D. program, course requirements depend upon individual circumstances and must be approved by the Department of Electrical Engineering. The emphasis is on research leading to a thesis of high calibre.

(6) Financial assistance can be arranged. This may take the form of part-time teaching assistantships, scholarships listed in the Awards section of the Calendar, or research grants.

## 204.26.2 / GRADUATE COURSES

EE 500. *Design Project.* No credit (time equivalent to one half-course). Detailed engineering report in the major area of interest of the student.

EE 501. *Special Topics in Electrical Engineering I.* ♦3 (First Term, 3-0). Intended to enable individual students to study special topics in their particular field of interest under the supervision of a member of the faculty.

EE 502. *Special Topics in Electrical Engineering II.* ♦3 (Second Term, 3-0). Same as EE 501 except this course number is to be used during the Second Term.

EE 522. *Power System Problems I.* ♦3 (First Term, 3-0). Selected power system topics such as stability, circuitbreaking, economics scheduling of generation, overvoltages, digital and analog approaches to analysis.

EE 523. *Power System Problems II.* ♦3 (Second Term, 3-0). A continuation of EE 522 considering topics such as tie line control, excitation and its effect on the system. The application of control system is emphasized.

EE 531. *Solid State Circuit Design.* ♦3 (First Term, 3-0). Selection of device types; biasing for linear and switching circuits; noise; linearity; stability; differential amplifiers.

EE 532. *Linear and Quasilinear Circuits.* ♦3 (Second Term, 3-0). Operational amplifier design; regulated power supplies; class D amplifiers; active filters; power amplifiers; distortion analysis; frequency response of operational amplifiers.

EE 535. *Logical Design of Digital Computers.* ♦3 (Second Term, 3-0). A continuation of EE 479. Topics to include NAND NOR Logic, digital computer memories, computer arithmetic units and control units.

EE 541. *High Vacuum Technology.* ♦3 (First Term, 3-3/2). Gas kinetics; gas flow; pumping speed theory; pumping methods; pressure measurement; vacuum system design; leak detection techniques; residual gas analysis; absorption processes.

EE 542. *Special Topics Using High Vacuum Technology.* ♦3 (Second Term, 3-0). Ion bombardment of solid and thin film surfaces; sputtering of thin films; growth; structure and properties of thin films; field ion microscopy.

EE 545. *Selected Laser Topics.* ♦3 (Second Term, 3-0). Design, construction and operational aspects of various types of lasers; principles of modulation and detection; transmission medium effects; optical components and concepts; information systems; noise and quantum considerations; special applications.

EE 551. *Network Synthesis I.* ♦3 (First Term, 3-0). Energy functions: positive real functions; driving point function synthesis of two element and three element one port passive networks; introduction to transfer function synthesis of passive two port networks; determination of net work functions; introduction to approximation.

EE 552. *Network Synthesis II.* ♦3 (Second Term, 3-0). Transfer function synthesis of passive lossless and lossy two port networks; use of Matrix Factorization technique in network synthesis; approximation; time domain synthesis of passive and active networks; concepts of equivalence in network theory. Prerequisites: EE 551 or equivalent.

EE 555. *Introduction to Modern Control Theory.* ♦3 (First Term, 3-0). The control problem; linear vector spaces; linear transformations; eigenvalues; quadratic forms; matrix calculus; vector-matrix differential equations; state transition matrix; state-space approach to system analysis; controllability and observability of multivariable systems; introduction to Lyapunov stability criterion; Z-transforms.

EE 556. *Introduction to Stochastic Processes and Nonlinear Analysis.* ♦3 (First Term, 3-0). Principles of statistics; correlation and power spectrum of stationary processes; optimum filters using mean square error criterion; introduction to nonlinear analysis.

EE 560. *Optimal Control Systems.* ♦3 (Second Term, 3-0). The optimal control problem-performance indices; use of calculus of variations in optimal control; Pontryagin's Maximum Principle (PMP); applications of PMP to time-optimal and energy-optimal control problems. Prerequisite: EE 555 or equivalent.

EE 562. *Sampled Data Control Systems.* ♦6 (2-3/2).

EE 566. *Nonlinear Systems Theory.* ♦3 (Second Term, 3-0). Topics in nonlinear analysis; describing function methods; Lyapunov stability theory; Popov stability criterion; study of nonlinear systems using functional analysis; nonlinear systems with random inputs.

EE 567. *Advanced Communication Theory.* ♦3 (Second Term, 3-0).

EE 570. *Electromagnetic Theory.* ♦3 (First Term, 3-0). Maxwell's equations; plane waves; waveguides; resonant cavities; periodic loading; perturbation theory; radiation, the Hertz dipole; loop and linear antennae.

EE 571. *Electromagnetic Waves.* ♦3 (Second Term, 3-0). Surface waves; propagation in anisotropic media; variational methods for waveguide discontinuities; secondary sources; Bethe hole coupling theory; radiation from antenna; horns and slots; space charge waves.

EE 572. *Electron Dynamics.* ♦3 (Second Term, 3-0). Relativistic mechanics and the Lorentz transformation; the electromagnetic field tensor; Lienard-Wiechert potentials; radiation from an accelerated charge; Cherenkov radiation; radiation reaction.

EE 575. *Principles of Particle Accelerators.* ♦3 (First Term, 3-0).

EE 580. *Microwave Measurements and Techniques.* ♦3 (Second Term, 2-3/2). Measurement of power; impedance and frequency; representation and measurement of microwave circuits; resonant cavity characteristics; microwave properties of dielectrics; noise in microwave communications systems.

EE 581. *Semiconductor Microwave Electronics.* ♦3 (Second Term, 3-0).

EE 593. *Elements of Plasma Theory.* ♦3 (First Term, 3-0). The theoretical background for investigating plasmas developed from Kinetic theory; topics include Saha's equation; Debye potential; Liouville's equation; the BBGKY kinetic theory; the moment equations including mangetohydrodynamic problems, the Vlassov theory with examination of plasma oscillations and Landau damping.

EE 594. *Plasma Kinetic Theory.* ♦3 (Second Term, 3-0). Topics include the adiabatic assumption; Balescu-Lenard kinetic equation; finite Larmor radius theory; and quasi-linear theory.

EE 595. *Plasma Devices and Diagnostics.* ♦3 (Second Term, 3-0). Methods of obtaining plasmas; shock tubes; discharges etc.; plasma diagnostics including electric, magnetic, and optical probing of plasmas.

## 204.27 / *Elementary Education*

### 204.27.1 / THE DEGREES OF M.ED., ED.D., AND PH.D.

(1) The Department of Elementary Education offers the degrees of M.Ed., Ed.D., and Ph.D.

(2) Graduate instruction is offered in the above degree programs related to early childhood and elementary education. These programs are designed to help prepare consultants and supervisors, master teachers and personnel for Teacher Education institutions.

(3) Before a student can be admitted as a candidate for the M.Ed. or higher degree, his record must be acceptable to the Faculty of Graduate Studies and to the Department. Admission requirements include the holding of a valid teaching certificate and an undergraduate degree, equivalent to The University of Alberta B.Ed. degree, with good standing.

(4) Admission to the Ed.D. or Ph.D. program normally requires the equivalent of a University of Alberta M.Ed. degree. Under certain circumstances, it is possible to enter with the equivalent of the B.Ed. degree, but in such instances, potential candidates must plan at least three years of continuous attendance.

(5) In addition to the thesis, requirements for the M.Ed. degree include five or six graduate courses and evidence of a minimum of one year's successful teaching experience. The Ed.D. and Ph.D. programs have the same teaching requirement and include a course program arranged with the staff of the Department. The Ph.D. program requires demonstrated proficiency in one second language.

(6) The M.Ed. is normally completed in fourteen consecutive months, beginning with a summer session. The Ed.D. and Ph.D. programs normally require two full years of residence.

(7) A generous number of research, service, teaching, and dissertation assistantships is available.

(8) Application forms for admission to a program are available from the Faculty of Graduate Studies and further information regarding the programs may be secured by writing to the head of the Department.

### 204.27.2 / GRADUATE COURSES

ED CI 500. *Graduate Seminar.* Reports and discussion by staff and graduate students to provide candidates for advanced degrees with experience in the selection and evaluation of research problems and procedures. The seminar will be offered as arranged. No course credit will be given.

ED CI 501. *Seminar in Elementary Education.* ♦3 either term, 3-0). Prerequisite: Consent of the Department.

ED CI 502. *Research Seminar.* ♦6 (3-0). Prerequisite: consent of the Department.

ED CI 503. *Directed Individual Study in Elementary Education.* ♦3 (either term, 3-0). Prerequisite: consent of the Department.

ED CI 506. *Program Development in Elementary Social Studies.* ♦6 (3-0). Prerequisite: ED CI 407 or consent of the Department.

ED CI 509. *Program Development in the Performance Aspect of the Art Curriculum.* ♦3 (either term, 3-0). Prerequisite: ED CI 410 or consent of the Department.

ED CI 511. *Program Development in the Analytical and Historical Aspects of the Art Curriculum.* ♦3 (either term, 3-0). Prerequisite: ED CI 410 or consent of the Department.

ED CI 514. *Program Development in Elementary School Music.* ♦6 (3-0). Prerequisite: ED CI 414 or consent of the Department.

ED CI 518. *Physiology and Psychology of Reading.* ♦6 (3-0). Prerequisite: ED CI 417 or consent of the Department.

ED CI 520. *Clinical Study of Remedial Reading.* ♦6 (3-3). Prerequisite: ED CI 518 and consent of the Department.

ED CI 522. *Organization and Supervision of the Reading Program.* ♦6 (3-0). Prerequisite: ED CI 417 or consent of the Department.

ED CI 526. *Program Development in Early Childhood Education.* ♦6 (3-0). Prerequisite: ED CI 326 or consent of the Department.

ED CI 528. *Program Development in Elementary School Mathematics.* ♦6 (3-0). Prerequisite: ED CI 429 or consent of the Department.

ED CI 532. *Program Development in Elementary School Science.* ♦6 (3-0). Prerequisite: ED CI 433 or consent of the Department.

ED CI 536. *Program Development in Second Languages at the Elementary Level.* ♦6 (3-0). Prerequisite: ED CI 333, 335 or 339 or consent of the Department.

ED CI 538. *Program Development in Elementary School Language.* ♦6 (3-0). Prerequisite: ED CI 437 or ED CI 439 or equivalent.

ED CI 580. *Curriculum Development.* ♦6 (3-0). Curriculum research, theory and practice with particular reference to curriculum aims, content, organization, and change.

ED CI 602. *Conference Course in Elementary Education.* ♦6.

ED CI 618. *Research in Reading.* ♦6. Prerequisite: ED CI 254 or 454, or consent of the Department.

ED CI 628. *Research in Mathematics Education.* ♦6.

ED CI 638. *Research in Language.* ♦6.

## 204.28 / *English*

### 204.28.1 / THE DEGREES OF M.A. AND PH.D.

(1) The Department of English offers graduate work leading to the Master of Arts and Doctor of Philosophy degrees in English Language and Literature.

(2) The M.A. program of a student with an honors B.A. in English (or its equivalent) will normally consist of three graduate courses in the Department, some practical training in bibliography, a thesis, and an oral defence of the thesis. The student will spend a minimum of one year in residence. The M.A. program of a student with a general B.A. will normally consist of eight courses (five undergraduate, three graduate), a thesis, and an oral defence of the thesis. A reading knowledge of one language other than English will be required of all students (normally French or German, though other languages may be approved).

(3) A student with an M.A. in English (or its equivalent) may be admitted as a provisional candidate for the Ph.D. degree. The program of a provisional candidate will normally include four graduate courses (one of which will be taken outside the Department of English), and departmental examinations, written and oral. The student must demonstrate a reading knowledge of two languages other than English (usually French and German). After a student has passed all examinations, he will become a candidate for the Ph.D., and will then submit a thesis and make an oral defence of the thesis.

(4) The Department has regular provision for teaching assistantships. Application should be made, if possible, by April 1.

### 204.28.2 / GRADUATE COURSES

Courses will be prescribed from the published list of senior and advanced undergraduate courses and from the following graduate courses:

ENGL 552. *Conference Course.* ♦6 (3-0).
ENGL 560. *Bibliography and Methods of Research.* ♦NW (1-0).
ENGL 568. *Literary Criticism (Principles and History).* ♦6 (3-0).
ENGL 576. *Studies in the English Language.* ♦4 (2-0).
ENGL 584. *Creative Writing.* ♦6 (3-0).
ENGL 588. *Studies in American Literature.* ♦6 (3-0).
ENGL 590. *Canadian and Commonwealth Literature.* ♦6 (3-0).
ENGL 592. *Old Norse Literature.* ♦6 (3-0).
ENGL 610. *Studies in Old English Literature.* ♦6 (3-0).
ENGL 614. *Studies in Middle English Literature.* ♦6 (3-0).
ENGL 616. *Chaucer.* ♦6 (3-0).
ENGL 622. *The Scottish Chaucerians and English Literature of the Fifteenth Century.* ♦6 (3-0).
ENGL 628. *Medieval Drama.* ♦6 (3-0).
ENGL 634. *Studies in Renaissance Poetry.* ♦6 (3-0).
ENGL 640. *Shakespeare.* ♦6 (3-0).
ENGL 641. *Studies in Elizabethan and Jacobean Drama.* ♦6 (3-0).
ENGL 646. *Seventeenth Century Poetry and Prose.* ♦6 (3-0).
ENGL 652. *Milton.* ♦6 (3-0).
ENGL 654. *Restoration and Eighteenth Century Drama.* ♦6 (3-0).
ENGL 658. *Studies in Eighteenth Century Literature.* ♦6 (3-0).
ENGL 660. *Studies in the Eighteenth Century Novel.* ♦6 (3-0).
ENGL 662. *Studies in the Romantic Novel.* ♦6 (3-0).
ENGL 664. *Studies in the Romantics.* ♦6 (3-0).
ENGL 670. *Currents of Thought in English Literature since 1790.* ♦6 (3-0).
ENGL 671. *Studies in Victorian Poetry.* ♦6 (3-0).
ENGL 672. *The Victorian Novel.* ♦6 (3-0).
ENGL 676. *Studies in the Modern Novel.* ♦6 (3-0).
ENGL 678. *Studies in Twentieth Century Prose.* ♦6 (3-0).
ENGL 682. *Studies in Twentieth Century Poetry.* ♦6 (3-0).
ENGL 684. *Studies in Modern Drama.* ♦6 (3-0).
ENGL 692. *Technique of the Novel.* ♦6 (3-0).

## 204.29 / *Entomology*

### 204.29.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Entomology offers programs leading to the degrees of M.Sc. and Ph.D. Laboratory space is available for about twenty-five students.

(2) For research in taxonomy, the Department maintains an extensive collection of specimens and a library of offprints. There is basic equipment for study and experiment in morphology, physiology, ecology, and applied entomology.

(3) Programs may include Entomology 317, 318, 471, 476, 527, 528, 556, 560, 610, 621, and 650 together with appropriate courses offered by other departments. The general regulations for the M.Sc. and Ph.D. degrees apply.

(4) Funds for special projects can usually be made available.

(5) Inquiries should be directed to the head of the Department.

### 204.29.2 / UNDERGRADUATE COURSES

The following may be taken for graduate credit:

ENT 471. *Project in Applied Entomology.* A survey of the literature on one or more topics in applied entomology with or without an experimental study of a related simple problem. Weight according to work done to a maximum of ♦6.

ENT 476. *Insect Toxicology.* ♦6 (2-4). Selective toxicity principles. Chemistry, mode of action, and metabolism of insecticides and repellents. Prerequisite: Chemistry 230 and 250 or 350, Entomology 200 or 302 desirable. Textbook: O'Brien, *Insecticides, Action and Metabolism.*

### 204.29.3 / GRADUATE COURSES

ENT 527. *Insect Taxonomy.* ♦3 (First Term, 3-0). Principles and procedures. Classification of insects. Zoological nomenclature. Speciation, phylogeny and zoogeography. Prerequisites: Entomology 317 desirable. Corequisite: Entomology 528 or consent of instructor.

ENT 528. *Insect Taxonomy.* ♦6 (0-6). A laboratory study related to Entomology 527. Prerequisite or corequisite: Entomology 527.

ENT 560. *Insect Ecology.* ♦6 (2-5). Relationships of insects to their environment. Community interactions. Prerequisite: Entomology 201 or 200 and 471.

ENT 610. *Advanced Morphology and Histology.* Continuing from Entomology 314 including a detailed study of internal structure. Weight according to work done to a maximum of ♦6. Prerequisite: Entomology 317.

ENT 621. *Advanced Taxonomy.* Classification and biology of, and literature on, one or more of the major orders. Weight according to work done to a maximum of ♦6. Prerequisite: Entomology 522.

ENT 650. *Project in Insect Physiology.* A review and interpretation of literature on a selected topic with an experimental study of a related problem. Weight according to work done to a maximum of ♦6. Prerequisite: Entomology 556.

## 204.30 / *Food Science*

### 204.30.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Food Science offers programs leading to the degrees of M.Sc. and Ph.D.

(2) Research for these degrees is possible in Food Chemistry, Food and Industrial Microbiology and Food Technology.

(3) Graduate credit may be given for certain extra-departmental undergraduate courses including Animal Science 468, 469; Microbiology 401, 402, 403; Soil Science 430; Biometrics 455; Horticulture 455; Plant Pathology 540. Graduate credit may also be given for all senior courses at the 400 level and above (with the exception of Food Science 490) that are listed in the undergraduate calendar providing these courses are not in the student's field of study.

(4) The research of this Department receives financial support from the Canada Department of Agriculture, the National Research Council of Canada, the Medical Research Council, the Province of Alberta and others. Such grants-in-aid provide for a number of assistantships. The assistants, if eligible, are permitted to register in the Faculty of Graduate Studies and their research findings may be presented to the University as M.Sc. or Ph.D. theses. Various Graduate Fellowships and Scholarships such as those offered by the above-mentioned organizations are tenable in the department as also are Graduate Teaching Assistantships, Graduate Research Assistantships and Graduate Service Assistantships and Post-Doctorate Fellowships awarded by the University.

(5) Graduates who desire to take a graduate degree should consult a member of the Department who may be able to suggest a program of study suited to the interests of the student or they should write to the head of the Department.

### 204.30.2 / GRADUATE COURSES

FD SC 650. *Food Science Seminar.* ♦2 (1s-0).

FD SC 660. *Food Microbiology.* ♦3 (First Term, 3-0). J. Jackson and L. F. L. Clegg.

FD SC 671. *Food Chemistry.* ♦3 (Second Term, 3-3). J. M. deMan.

FD SC 672. *Food Chemistry.* ♦1 (Second Term, 1-3). J. M. deMan.

## 204.31 / *Genetics*

### 204.31.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Genetics offers programs leading to the Master of Science and Doctor of Philosophy degrees.

(2) Investigations being carried out in the Department include work on biochemical genetics of bacteria, fungi, *Drosophila* and higher plants, radiation biology and mammalian cell cultures, cytology and cytotaxonomy of animals and plants (including fungi), population genetics of animals and man, ecological aspects of genetic polymorphism, theoretical and applied quantitative genetics of plants, chemically induced mutation and recombination and developmental genetics. The Department is fully equipped to handle these fields and, in addition, facilities such as an electron microscope, computer and Van de Graaf accelerator are available on an interdepartmental basis.

(3) Eligible applicants will be admitted for graduate work only if facilities and space are available for the project they propose to undertake.

(4) Normally all senior courses are acceptable in the graduate program. It should be emphasized that course programs are normally based on the student's previous training and anticipated needs in the field he has chosen. In the case of students from universities other than The University of Alberta, and for some graduates of that University, an early assessment examination will

usually be required and the course program undertaken will be determined by the results of the examination. Graduate students are not required to take a language other than English for the master's degree but are advised to do so if they plan to continue beyond it.

(5) Two years are normally required for either the master's or doctorate program. The doctorate program developed on the basis of a bachelor's degree (usually with honors) normally requires at least three years.

(6) Financial assistance is available for a limited number of students.

(7) Inquiries should be directed to the chairman, Department of Genetics.

### 204.31.2 / GRADUATE COURSES

GENET 420. *Genetics of Bacteria and Viruses.* ♦3 (First Term, 3-0). A. Ahmed. (Not offered, 1968-69.)
GENET 430. *Fungal Genetics.* ♦3 (First Term, 3-0). J. Weijer.
GENET 445. *Biochemical Genetics.* ♦3 (Second Term, 3-0). A. Ahmed.
GENET 463. *Principles of Plant Breeding.* ♦3 (Second Term, 3-0). W. E. Smith.
GENET 465. *Human Genetics.* ♦3 (First Term, 3-0). D. G. Cameron. (Not offered, 1968-69.)
GENET 481. *Population Genetics.* ♦3 (First Term, 3-0). L. P. V. Johnson.
GENET 483. *Evolutionary Genetics.* ♦3 (Second Term, 3-0). D. G. Cameron. (Not offered, 1968-69.)
GENET 505. *Reading or Research Project.* ♦3 or 6.
GENET 511. *Cytology.* ♦3 (First Term, 3-3). G. W. R. Walker.
GENET 515. *Cytogenetics.* ♦3 (Second Term, 3-0). J. Kuspira.
GENET 517. *Mathematical Foundations of Genetic Analyses.* ♦3 (Second Term, 3-3). R. Aksel, G. W. R. Walker, L. P. V. Johnson.
GENET 520. *Quantitative Genetics.* ♦3 (Second Term, 3-0). L. P. V. Johnson. (Not offered, 1968-69).
GENET 552. *Radiation Genetics.* ♦3 (Second Term, 3-0). J. Weijer.
GENET 586. *Developmental Genetics.* ♦3 (First Term, 3-0). D. Nash. (Not offered, 1968-69.)
GENET 601. *Genetics Seminar.*

## 204.32 / *Geography*

### 204.32.1 / THE DEGREES OF M.A., M.SC., AND PH.D.

(1) The Department of Geography offers the degrees of Master of Arts, Master of Science, and Doctor of Philosophy. Graduate work for each of these degrees includes presentation of an acceptable thesis.

(2) The Department will approve only thesis topics which lie within the research speciality of one or more of its staff members.

(3) Entrance requirements are as laid down in the general regulations of this Calendar.

(4) M.A. and M.Sc. candidates' programs will be prepared under the general regulations for the master's degree, with the further requirement of a reading knowledge of a modern language other than English (ordinarily French or German).

(5) Ph.D. candidates' programs will be prepared under the general regulations for that degree, with the further requirement of a reading knowledge of two modern languages other than English, one of which must be French or German. Where appropriate to the individual program the Department may approve substitution of Statistics for the second foreign language.

(6) A number of assistantships (teaching, research, service) are available for qualified students, both through University funds and through research funds at the disposal of the Department.

### 204.32.2 / GRADUATE COURSES

GEOG 500. *History and Nature of Geography.* ♦6 (1-2s-1). O. F. G. Sitwell.
GEOG 501. *Air Photo Interpretation.* ♦6 (6L). A. H. Laycock.
GEOG 502. *Reading and Seminar Course.* ♦6.
GEOG 503. *Climatology.* ♦3 (First Term, 3-0). S. I. Smith.
GEOG 506. *Scandinavia.* ♦6 (3-1s-3). W. C. Wonders.
GEOG 508. *Land Use Analysis and Planning.* ♦6 (1-2s-1). P. J. Smith.
GEOG 510. *Historical Geography.* ♦6 (1-2s-1). J. F. Bergmann.
GEOG 512. *Advanced Urban Geography.* ♦6 (3s). D. B. Johnson.
GEOG 523. *Geographic Concepts and Research Methods.* ♦6 (3-3). O. F. G. Sitwell and staff.
GEOG 525. *Field School in Geography.* ♦2.
GEOG 541. *Cartographic Design and Editing.* ♦6 (6L). J. J. Klawe.
GEOG 542. *Seminar on Latin America.* ♦6 (3s). J. F. Bergmann.
GEOG 544. *Seminar on Africa.* ♦6 (3s). S. I. Smith.
GEOG 546. *Inter-Disciplinary Seminar in Soviet and East European Studies.* ♦6 (3s). See INTER D 546.
GEOG 548. *The Tropical Word.* ♦6 (3s).
GEOG 550. *Research in Regional Geography.* ♦6.
GEOG 551. *Research in Physical Geography.* ♦6.
GEOG 552. *Research in Human Geography.* ♦6.
GEOG 553. *Special Research Problems.* ♦6.
GEOG 558. *Transportation Geography.* ♦6 (3s).
GEOG 561. *Water Resources.* ♦6 (3L). A. H. Laycock.
GEOG 580. *Seminar on Geography of Settlement.* ♦6 (3s). W. C. Wonders.
GEOG 630. *Advanced Research in Regional Geography.* ♦6.
GEOG 631. *Advanced Research in Physical Geography.* ♦6.
GEOG 680. *Advanced Research in Human Geography.* ♦6.
GEOG 690. *Seminar on Geographic Thought.* ♦6. O. F. G. Sitwell.
GEOG 696. *Special Problems.* ♦6.

## 204.33 / *Geology*

### 204.33.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Geology offers graduate work leading to the Master of Science and Doctor of Philosophy degree.

(2) The fields of study open for research in the Department are: mineralogy, petrology, geochemistry, geochronology, paleontology, stratigraphy, sedimentation, economic geology, geomorphology, glacial geology, hydrogeology, and structural geology.

(3) The M.Sc. and Ph.D. programs require the student to pass satisfactorily an appropriate selection of graduate courses and to present and defend a thesis.

(4) Teaching assistantships are available for qualified students.

(5) Inquiries should be made to the head of the Department.

### 204.33.2 / GRADUATE COURSES

NOTE: Courses marked with an asterisk (*) are offered in alternate years only, and will be offered in 1968-69. Courses marked with a dagger (†) are offered in alternate years only, and will not be offered in 1968-69.

*GEOL 501. *Advanced Structural Geology.* ♦3 (First Term, 3-0).

*GEOL 502. *Sedimentary Petrology and Sedimentation.* ♦3 (2s-0).

†GEOL 503. *Advanced Stratigraphy.* ♦6 (3-3).

GEOL 507. *Advanced Metamorphic Petrology.* ♦3 either term, 3s-0).

*GEOL 508. *Precambrian Geology.* ♦3 (First Term, 3s-0).

*GEOL 510. *Advanced Mineralogy.* ♦3 (First Term, 3-3).

†GEOL 511. *Regional Structural Geology.* ♦3 (Second Term, 3-0).

*GEOL 512. *Pleistocene Geology.* ♦3 (First Term, 3s-0).

GEOL 513. *Field Work in Geomorphology and Glacial Geology.* ♦3 (One day of field work each week).

GEOL 514. *Rock Analysis.* ♦3 (either term, 1-3).

†GEOL 515. *Advanced Micropaleontology.* ♦3 (either term, 2-4).

†GEOL 516. *Advanced Paleontology.* ♦3 (either term, Term, 3s-0).

*GEOL 517. *Advanced Geochemistry.* ♦3 (Second Term, 3S-0).

GEOL 518. *Paleontology of the Lower Vertebrates.* ♦3 (First Term, 3-3).

GEOL 519. *Paleontology of the Higher Vertebrates.* ♦3 (Second Term, 3-0).

*GEOL 522. *Advanced Sedimentary Petrography.* ♦3 (First Term, 1-3).

*GEOL 565. *Quantitative Geomorphology.* ♦3 (Second Term, 3-3).

†GEOL 592. *Organic Geochemistry.* ♦3 (Second Term, 3s-0).

GEOL 609. *Geological Research.* ♦3 (either term, 0-8).

†GEOL 610. *Isotope Geology.* ♦3 (Second Term, 3-0).

†GEOL 611. *Palynology.* ♦3 (either term, 3s-3).

†GEOL 612. *Ore Deposits.* ♦3 (Second term, 3s-3).

†GEOL 613. *Mineralogy Seminar.* ♦3 (Second Term, 3s-0).

GEOL 620. *Problems in Vertebrate Paleontology.* ♦3 (1-0).

## 204.34 / *Germanic Languages*

### 204.34.1 / THE DEGREES OF M.A. AND PH.D.

(1) The Department of Germanic Languages and General Linguistics offers graduate work leading toward the M.A. and Ph.D. degrees in all areas of German Literature, Germanic Linguistics, and Philology. (Studies leading toward the M.A. and Ph.D. in General Linguistics are described under Linguistic Studies.)

(2) Among the areas for which the Department is especially qualified, through staff and library resources, to direct work leading to graduate degrees, are Germanic philology and linguistics, Medieval Literature, The Age of Goethe, Romanticism, Nineteenth and Twentieth Century Literature. The University Library is especially rich in primary and secondary sources, including periodicals, of the post-naturalistic period and is fortunate in having the *Georg Kaiser Collection* which offers a rare opportunity for research into the life and work of this author, using photocopies of original material much of which is still unpublished.

(3) For the M.A. degree, the admission requirements are those of the Faculty of Graduate Studies.

(4) For admission as a provisional candidate for the Ph.D. degree, in general, The University of Alberta M.A. in German or its equivalent (including *Staatsexamen*) will be required. Students whose M.A. was obtained without thesis will be required to write an extended term paper in one of their graduate courses during the first term of their first year of doctoral studies. Students must also demonstrate their proficiency in oral and written German.

(5) In addition to the general thesis requirement, there are certain course requirements for the M.A. degree. For students with a three-year B.A. up to eight courses are required, for students with a four-year B.A., but who have changed fields during the course of the degree, up to six courses are required, and for students with a B.A. Honors degree in German up to four courses are required. All M.A. candidates are required to take a final oral examination.

(6) For the Ph.D. degree, the requirements, in addition to the dissertation, are as follows:

(i) Reading proficiency in an approved language other than German or English;

(ii) Six full graduate courses or their equivalent, including German 595 (unless taken for an M.A. at this University) and a course in Germanic Philology (unless taken at The University of Alberta or elsewhere).

(iii) A minor in an approved subject to be selected from outside the Department comprising not less than one and not more than two full courses.

(iv) The candidacy examination consisting of a written part and a two-hour oral examination.

(v) The final oral examination.

(7) The minimum length for the M.A. and Ph.D. programs is as specified by the Faculty of Graduate Studies. The actual time taken may vary for individual students depending on their previous training and the rate of progress in their research projects.

(8) Financial assistance is available in the form of fellowships and Graduate Research, Service, and Teaching Assistantships.

(9) For further information contact the head of the Department.

### 204.34.2 / GRADUATE COURSES: GERMAN

Before registering for these courses, students must consult the Department to ensure that they are qualified to undertake the work.

GERM 500. *Special Reading Course.* ♦6 (3-0). Specifically designed for graduate students who wish to prepare themselves for the Ph.D. language requirement in German. An intensive study of essential grammar, reading of graded texts and translation of texts selected from the student's own fields. Conducted on a tutorial basis. Note: Graduate students who obtain a grade of 6 or better will be considered by the Department as having fulfilled the reading requirement in German for the Ph.D. at The University of Alberta. Not open to undergraduates.

GERM 504. *Practical Oral Study of the German Language.* ♦2 (0-1). Note: For fourth year honors students.

GERM 510. *Advanced German Composition.* ♦4 (2-0). Advanced German composition and conversation; study of difficult problems of grammar, idioms and style. Note: Required of all students taking honors and majoring in German.

GERM 595. *Bibliography and Methodology.* ♦6 (3-0).

GERM 608. *Early Middle High German Literature.* ♦6 (3-0).

GERM 610. *Middle High German Literature.* ♦6 (3-0).

GERM 612. *Late Middle High German Literature.* ♦6 (3-0).

GERM 614. *Humanism, Reformation and Baroque.* ♦6 (3-0).

GERM 618. *Enlightenment.* ♦6 (3-0).

GERM 620. *Classicism.* ♦6 (3-0).

GERM 622. *Goethe.* ♦6 (3-0).

GERM 624. *Schiller.* ♦6 (3-0).

GERM 625. *Romanticism.* ♦6 (3-0).

GERM 635. *Realism.* ♦6 (3-0).

GERM 637. *Naturalism.* ♦6 (3-0).

GERM 639. *Expressionism.* ♦6 (3-0).

GERM 645. *Twentieth Century Literature.* ♦6 (3-0).

GERM 655. *Studies in German Poetry.* ♦6 (3-0).

GERM 665. *Studies in the German Novel.* ♦6 (3-0).

GERM 675. *Studies in the German Novelle.* ♦6 (3-0).

GERM 685. *Studies in German Drama.* ♦6 (3-0).

GERM 693. *Studies in German Folklore.* ♦6 (3-0).

GERM 695. *Studies in Literary Criticism.* ♦6 (3-0).

GERM 698. *Special Topics in German Literature.* ♦6 (3-0).

GERM 699. *Conference Course.* An honors or graduate course designed to meet the needs of individual students. It may include the detailed study of an author, period, genre, or any literary problem not dealt with in the honors or graduate courses listed above.

### 204.34.3 / GRADUATE COURSES: GERMANIC LINGUISTICS AND PHILOLOGY

GERM 540. *Old High German.* ♦3 (First Term, 3-0).

GERM 550. *Gothic.* ♦3 (First Term, 3-0).

GERM 560. *History of the German Language.* ♦3 (First Term, 3-0).

GERM 575. *Studies in Indo-European.* ♦3 (First Term, 3-0).

GERM 580. *Comparative German Grammar.* ♦3 (Second Term, 3-0).

GERM 590. *Old Saxon.* ♦3 (Second Term, 3-0).

GERM 697. *Special Topics in Germanic Linguistics and Philology.* ♦6 (3-0).

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## 204.35 / *History*

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### 204.35.1 / THE DEGREES OF M.A. AND PH.D.

(1) The Department of History offers instruction leading to the degrees of Master of Arts and Doctor of Philosophy.

(2) The M.A. program is offered in Canadian, United States, European, British, and East Asian history. Ph.D. work in these fields is offered in certain areas of research for which adequate supervision and library resources are available.

(3) Students holding a four-year Honors B.A. in History from a Canadian university, or an equivalent foreign degree, may be admitted as candidates for the M.A. Students who lack the Honors degree in History, or its equivalent, may be admitted to the qualifying year. Students proposing to enter the Ph.D. program are normally expected to hold an acceptable M.A. or its equivalent.

(4) It is highly desirable and in many cases necessary that students entering the Department's graduate program have a reading knowledge in at least one language other than English, normally in French and/or German.

(5) Students admitted as candidates for the M.A. are required to take History 602; to pass a language examination in either French or German (another language, if closely related to the thesis project, may be substituted in special cases); and to write a thesis.

(6) Students admitted to the qualifying year must take at least two approved History seminars (400 level) and pass comprehensive written examinations in two fields of history (as defined in the 500-level courses listed below) before they can proceed to the M.A. program outlined above.

(7) All students working toward the Ph.D. are admitted as provisional candidates. Before being admitted to candidacy examinations, they must satisfy the following minimum requirements:

(i) History 602 (unless an equivalent course was taken previously);

(ii) A half-year research seminar (History 605);

(iii) Supervised study in two fields of history (History 621 ff.);

(iv) A language requirement. All provisional candidates must demonstrate by a Departmental examination their competence in at least one language other than English. A Departmental examination in a second foreign language will be administered in all cases where the student's program of study and research warrants it. Through no student will be formally examined on more than two foreign languages, degree candidates are expected to be proficient in any additional languages that are necessary for undertaking a particular dissertation project.

(8) To advance to candidacy, students must pass written and oral examinations in two fields of history (as defined in the list of courses, History 621 ff, below). These examinations will test both the student's general knowledge of each field and his expertise in some area of specialization within each of the two fields. The areas of specialization will be determined by the Department in consultation with the student and the instructors concerned.

(9) Upon successful completion of candidacy examinations, a dissertation, making a genuine contribution to knowledge, must be written and defended before a committee appointed by the Dean of the Faculty of Graduate Studies.

(10) Candidates for the M.A. must spend at least one academic year in full-time residence. Students entering the qualifying year should expect to spend two academic years on the completion of their degree; the first year must be in full-time residence. Students admitted to the Ph.D. program are required to spend at least two years in full-time residence. The Department offers no graduate courses extramurally, nor in the Evening Credit Programs, nor in the Summer Session.

(11) The Department offers a number of graduate teaching assistantships or service assistantships at stipends from $1,800 to $3,600, depending upon qualifications and experience. Graduate students are also eligible for various University fellowships and bursaries (including Intersession bursaries and dissertation fellowships) ranging in value up to $5,000.

(12) Application for admission forms, information about fellowships, bursaries, etc., and a departmental bulletin on *Higher Degrees in History* may be obtained from the Dean of the Faculty of Graduate Studies. Requests for other information should be directed to the Chairman, Graduate Studies Committee, Department of History.

## 204.35.2 / GRADUATE COURSES

The courses numbered from 511 to 520 are to be taken by M.A. students in the qualifying year. The courses numbered 621 and above are designed to give provisional candidates for the Ph.D. an opportunity to prepare for their candidacy examinations.

Previous study in the area is prerequisite for each course.

HIST 511. *British Medieval History (Comprehensive).* ♦6 (3-0).

HIST 512. *British Modern History (Comprehensive).* ♦6 (3-0).

HIST 513. *Canadian History (Comprehensive).* ♦6 (3-0).

HIST 514. *American History (Comprehensive).* ♦6 (3-0).

HIST 515. *Medieval European History (Comprehensive).* ♦6 (3-0).

HIST 516. *European History, 1500-1789 (Comprehensive).* ♦6 (3-0).

HIST 517. *European History since 1789 (Comprehensive).* ♦6 (3-0).

HIST 518. *Russian and East European History (Comprehensive).* ♦6 (3-0).

HIST 519. *British Empire and Commonwealth History (Comprehensive).* ♦6 (3-0).

HIST 520. *East Asian History (Comprehensive)* ♦6 (3-0).

HIST 600. *Conference Course.* Directed study to meet individual requirements.

HIST 602. *Philosophy of History and Historical Methodology.* Note: required of all candidates for higher degrees in History. ♦6 (3-0).

HIST 605. *Research Seminar.* ♦3 (either term, 3-0). Specific area of research is announced by the Department in the term before the seminar is offered.

HIST 621. *Medieval Europe.* ♦6 (3-0).

HIST 623. *Early Modern Western Europe.* ♦6 (3-0).

HIST 625. *Modern Western Europe.* ♦6 (3-0).

HIST 626. *Russia and Eastern Europe.* ♦6 (3-0).

HIST 652. *Medieval England.* ♦6 (3-0).

HIST 654. *Early Modern England.* ♦6 (3-0).

HIST 656. *Modern England.* ♦6 (3-0).

HIST 658. *The British Empire.* ♦6 (3-0).
HIST 660. *The United States.* ♦6 (3-0).
HIST 670. *Canada.* ♦6 (3-0).
HIST 680. *East Asia.* ♦6 (3-0).

## 204.36 / *Household Economics*

### 204.36.1 / THE DEGREE OF M.SC.

(1) Graduate work leading to the degree of Master of Science may be undertaken in the School of Household Economics. The major work may be done only in the field of nutrition.

(2) Candidates should hold a Bachelor's degree in Foods and/or Nutrition or an allied science and must meet the entrance requirements of the Faculty of Graduate Studies.

(3) A candidate may normally expect to take two academic years plus one summer to fulfil the requirements. For students proceeding from a general undergraduate program, six courses plus a thesis are required. When the thesis undertaken is a major piece of work, the number of courses may be reduced.

(4) A number of teaching and research assistantships are available for well qualified applicants.

(5) Inquiries should be addressed to the Director of the School.

### 204.36.2 / UNDERGRADUATE COURSE

The following may be taken for graduate credit:
H EC 458. *Nutrition.* ♦6 (3-3).

### 204.36.3 / GRADUATE COURSES

H EC 500. *Seminar.* ♦2 (1s-0).
H EC 502. *Research Project in Nutrition.* ♦6 (3L).
H EC 503. *Further Research Project in Nutrition.* ♦6 (3L).

## 204.37 / *Industrial and Vocational Education*

### 204.37.1 / THE DEGREE OF M.ED.

(1) The Department of Industrial and Vocational Education offers programs leading to the Master of Education degree in Industrial Arts and in Vocational Education.

(2) Graduate programs in Industrial Arts and in Vocational Education normally include both professional courses in education and senior or graduate courses offered by other faculties and schools in the University.

(3) Before a student can be admitted as a candidate for the M.Ed. degree, his record must be acceptable to the Faculty of Graduate Studies and to the Department.

(4) A number of assistantships are available to well-qualified candidates for the M.Ed. degree.

(5) The prospective candidate should consult the head of the Department of Industrial and Vocational Education who, together with other members of the staff, will plan an appropriate program.

### 204.37.2 / GRADUATE COURSES

*Industrial Arts Education*

ED IA 589. *Organization of Industrial Arts Education.* ♦3 (First Term, 3-0).
ED IA 591. *Problems and Trends in Industrial Arts Education.* ♦3 (Second Term, 3-0).
ED IA 594. *Research and Development Seminar in Industrial Arts Education.* ♦6 (3-0).

*Vocational Education*

ED VOC 550. *Vocational Guidance-Conference Seminar.* ♦2 (1-3).
ED VOC 589. *Organization of Vocational Education.* ♦3 (First Term, 3-0).
ED VOC 591. *Problems and Trends in Vocational Education.* ♦3 (Second Term, 3-0).
ED VOC 594. *Research and Development Seminar in Vocational Education.* ♦6 (3-0).

## 204.38 / *Law*

### 204.38.1 / THE DEGREE OF LL.M.

(1) The Faculty of Law offers a program of graduate study leading to the degree of Master of Laws.

(2) Applicants for this program should hold the degree of LL.B. or its equivalent from this or some other university, and must meet the general requirements for admission to the Faculty of Graduate Studies.

(3) The program normally requires attendance at courses four hours a week for two terms, and the submission and defence of a thesis. Courses are available only in specialized fields. All programs must be approved by the Dean of the Faculty.

(4) Inquiries regarding programs, courses, and financial assistance should be made to the Dean of the Faculty.

### 204.38.2 / THE DIPLOMA IN PETROLEUM LAW

(1) Those qualified in legal systems other than the Common Law may pursue a program of advanced study leading to the Diploma in Petroleum Law. This program is administered by the Faculty of Law.

(2) Details about the diploma program are given in the Faculty of Law section of the Calendar. Further inquiries should be directed to the Dean of the Faculty.

# 204.39 / *Linguistics*

## 204.39.1 / THE DEGREES OF M.A. AND PH.D.

(1) Graduate programs leading to the degrees of Master of Arts and Doctor of Philosophy in General Linguistics are administered by an interdepartmental committee including representatives of the Departments of Classics, English, Germanic Languages and General Linguistics, Romance Languages, Slavonic Languages, and Sociology, and of the Faculty of Education. (Graduate programs centring on the study of a specific language are normally administered solely by the department concerned.)

(2) Research may be undertaken in such fields as general, descriptive, or applied linguistics; transformational grammar; American Indian languages; and computational linguistics.

(3) A prerequisite for admission to graduate study in Linguistics is proficiency in two languages other than English. Special cases will be considered by the Committee.

(4) All graduate programs in Linguistics require the satisfactory completion of approved courses and the presentation and defence of a thesis based on research in an approved field.

(5) Inquiries about both programs of study and financial assistance, should be directed to the Secretary, Interdepartmental Committee on Linguistic Studies, c/o Department of Germanic Languages and General Linguistics. Such inquiries should be made as early as possible, particularly by students who wish to take courses in the Summer School of Linguistics.

## 204.39.2 / GRADUATE COURSES: APPLIED LINGUISTICS

### *Education*

ED CI 340. *Teaching English as a Second Language.* ♦6 (10-0).
ED CI 380. *Curriculum and Instruction in the Secondary School (Latin).* ♦6 (10-0).
ED CI 456. *Curriculum and Instruction (English).* ♦6 (3-0).
ED CI 460. *Advanced Curriculum and Instruction in Secondary School Foreign Languages.* ♦6 (3-0).
ED CI 538. *Program Development in Elementary School Language.* ♦6 (3-0).
ED CI 680. *Graduate Seminar on the Teaching of (English) Language and Literature in the Secondary School.* ♦6 (3-0).

### *Interdepartmental Course*

INTER D 374. *Contrastive Linguistics (Russian-English).* ♦6 (3-0). Note: Formerly LING/RUSS 374.
LING 405. *Applied Linguistics.* ♦6 (3-0).
LING 660. *Studies in Applied Linguistics.* ♦6 (3-0).

### *Linguistics*

LING 370. *Contrastive Linguistics (French-English).* ♦6 (3-0).
LING 372. *Contrastive Linguistics (German-English).* ♦6 (3-0).
LING 374. *Contrastive Linguistics (Russian-English).* See Interdepartmental Course 374.

## 204.39.3 / GRADUATE COURSES: CLASSICS

### *Latin*

LATIN 506. *Sanskrit.* ♦6 (3-0).
LATIN 514. *Comparative Philology and Syntax.* ♦6 (3-0).
LATIN 531. *History of the Latin Language.* ♦3 (either term, 3-0).
LATIN 534. *Medieval Latin.* ♦3 (either term, 3-0).

### *Greek*

GREEK 521. *History of the Greek Language.* ♦3 (either term, 3-0).
GREEK 522. *Greek Epigraphy.* ♦3 (either term, 3-0).

## 204.39.4 / GRADUATE COURSES: ENGLISH

ENGL 308. *Old English Language and Literature.* ♦6 (3-0).
ENGL 388. *History of the English Language.* ♦6 (3-0).
ENGL 576. *Study of Language.* ♦6 (3-0).
ENGL 592. *Old Norse and Germanic Philology.* ♦6 (3-0).
ENGL 610. *Old English.* ♦6 (3-0).

## 204.39.5 / GRADUATE COURSES: GENERAL LINGUISTICS

LING 305. *Culture and Language.* ♦6 (3-0).
LING 350. *General Linguistics.* ♦6 (3-0).
LING 387. *Linguistic Geography.* ♦6 (10-0).
LING 389. *Modern English Grammar.* ♦6 (3-0).
LING 440. *Cree Phonology and Structure.* ♦6 (10-10).
LING 450. *Eskimo Language and Culture.* ♦6 (10-10).
LING 455. *Descriptive Linguistics.* ♦6 (3-0).
LING 465. *Historical Linguistics.* ♦6 (3-0).
LING 470. *American Indian Linguistics.* ♦6 (3-0).
LING 550. *Advanced Phonetics and Field Methods.* ♦6 (3-0).
LING 565. *Pidgins and Creoles.* ♦6 (3-0).
LING 575. *Languages of Mexico and South America.* ♦3 (Second Term, 3-0).
LING 650. *Studies in American Indian Languages.* ♦6 (3-0).
LING 670. *Intensive Language.* ♦4 (2-4).
LING 680. *Analytic Lexicology.* ♦6 (3-0).
LING 685. *Language Typology.* ♦6 (3-0).
LING 695. *Transformational Grammar.* ♦6 (3-0).
LING 697. *Seminar in Linguistic Theories.* ♦6 (3-0).
LING 699. *Conference Course.* An honors or graduate course designed to meet the needs of individual students.

## 204.39.6 / GRADUATE COURSES: GERMANIC LANGUAGES

### *German*

GERM 540. *Old High German.* ♦6 (3-0).
GERM 550. *Gothic.* ♦6 (3-0).
GERM 560. *History of the German Language.* ♦3 (Second Term, 3-0).
GERM 575. *Studies in Indo-European.* ♦3 (First Term, 3-0).
GERM 580. *Comparative German Grammar.* ♦3 (Second Term, 3-0).

GERM 590. *Old Saxon.* ♦3 (Second Term, 3-0).
GERM 697. *Special Topics in Germanic Linguistics and Philology.* ♦6 (3-0).

*Scandinavian*

SCAND 550. *Old Icelandic Philology.* ♦3 (First Term, 3-0).

### 204.39.7 / GRADUATE COURSES: ROMANCE LANGUAGES

*French*

FREN 601. *History of the French Language.* ♦6 (3-0).

*Spanish*

SPAN 540. *History of the Spanish Language.* ♦6 (3-0).

*Romance Linguistics*

ROM LG 500. *Phonology: Synchronic and Diachronic.* ♦6 (3-0).
ROM LG 505. *Comparative Romance Linguistics.* ♦6 (3-0).

### 204.39.8 / GRADUATE COURSES: SLAVONIC LANGUAGES

*Russian*

RUSS 420. *History of the Russian Language.* ♦6 (3-0).

*Slavonics*

SLAV 520. *Old Church Slavonic.* ♦6 (3-0).
SLAV 540. *Contrastive Slavonic Linguistics.* ♦6 (3-0).
SLAV 550. *Seminar in Slavonic Linguistics.* ♦2 (1-0).

## 204.40 / *Mathematics*

### 204.40.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Mathematics Department offers graduate programs leading to the degrees of Master of Science and Doctor of Philosophy in a number of fields, including Algebra, Approximation Theory, Classical Analysis, Control Theory, Combinatorics and Graph Theory, Differential Equations, Functional Analysis, Geometry, Mathematical Statistics, Number Theory, Relativity, Topology.

(2) Candidates for the M.Sc. who hold an honors degree in Mathematics (University of Alberta or equivalent) are required to take a minimum of three graduate courses, at least two of which must be in the Mathematics Department and not all of which may be in the same major area of mathematics, and to submit and defend a thesis in one of the fields mentioned above. These requirements may be completed in a minimum of one academic year.

(3) Candidates holding a pass degree in Mathematics will be required to meet the Honors degree level after which they must satisfy the requirements listed in ¶ (2) above.

(4) To be admitted as a provisional candidate for the Ph.D., a student must normally hold the equivalent of the M.Sc. in Mathematics at The University of Alberta. In addition to the examinations called for by the general regulations, he must pass a qualifying examination within thirteen months of becoming a provisional candidate. The principal requirement for the Ph.D. is a substantial contribution to knowledge, embodied in a thesis. Except in very special cases every Ph.D. student will be required to take a minimum of seven graduate courses after the B.Sc. (Honors) degree or equivalent, one of which must be Mathematics 650 to be taken in the first year. Candidates will spend at least two years in advanced study and research after the master's degree.

(5) Courses taken in other departments depend upon the field of interest of the candidate.

(6) Candidates for the M.Sc. degree must satisfy the Department that they have a competent reading knowledge of one of French, German, or Russian. Candidates for the Ph.D. must satisfy the Department's requirements in two of these languages.

(7) Graduate teaching assistantships are available for candidates working towards a higher degree. They involve at most twelve hours of work per week including teaching, class preparation and working time. Research and service assistantships are also available.

(8) Prospective graduate students should consult both the head of the Department and the staff member in charge of the field in which they are particularly interested.

### 204.40.2 / PROGRAMS IN MATHEMATICAL PHYSICS

(1) The Master of Science and Doctor of Philosophy degrees in Mathematical Physics may be taken in the Mathematics Department by a student with a good background in both Mathematics and Physics.

(2) Candidates with an Honors degree in Mathematics will be required to write a thesis on some topic in the field of theoretical, rather than experimental Physics, or in Applied Mathematics. The program of graduate courses will be selected in consultation with the heads of the Departments of Mathematics and Physics.

(3) Candidates who have a B.Sc. in the Mathematics pattern of the general program, with three or more courses in Physics, may be accepted for a two-year M.Sc. program in Mathematical Physics. The general conditions of § 204.40.1, ¶ (3) will apply.

## 204.40.3 / PROGRAMS IN STATISTICS

(1) The Master of Science and Doctor of Philosophy degrees in Mathematical Statistics may be taken in the Mathematics Department.

(2) Candidates for the M.Sc. degree with an Honors degree in Mathematics will be required to take at least two graduate courses in theoretical statistics, at least one other mathematics course, and to write a thesis on some topic in this field.

(3) Candidates with a general B.Sc. in Mathematics may be accepted for a two-year M.Sc. program if their pattern has included Statistics 255 and Statistics 450 or their equivalent. The general conditions of § 204.40.1, ¶ (3) will apply.

## 204.40.4 / GRADUATE COURSES: MATHEMATICS

A selection of courses, depending on demand, will be made from the following list:

MATH 501. *Theory of Functions of a Complex Variable.* ♦6 (3-0). The complex number system. Complex-valued functions. Convergence of series. Complex integration. Representation theorems. Calculus of residues. Prerequisite: Mathematics 440 and 426 or consent of the Department. Note: Only one of Mathematics 500 and 501 may be taken for credit towards a degree.

MATH 502. *History of Mathematics.* ♦6 (3-0). The Alexandrian School and the foundations of geometry. Saccheri and the beginnings of modern geometry. The renaissance of algebra in Europe, the Arabic heritage. Cartesian, metric and projective geometries. Development of calculus and mechanics. Logical foundations of mathematics. Prerequisite: Mathematics 306 and 360 or consent of the Department. Note: For B.A. Honors students in Mathematics.

MATH 505. *Foundations of Analysis.* ♦6 (3-0). The development of the number system from the natural numbers to the complex numbers. Proofs and definitions by induction. General sums and products. Decimal expansion of a real number. Finite, countable, and uncountable sets. Cardinal numbers. Well-ordered sets, ordinal numbers. Prerequisite: Mathematics 425.

MATH 510. *Abstract Algebra II.* ♦6 (3-0). Peano's axioms and their development. Structure theory of groups and rings. Galois theory. Valuation theory of fields. Lattice theory and Boolean algebras. Prerequisite: Mathematics 425.

MATH 515. *Number Theory.* ♦6 (3-0). Divisibility; congruences, primitive roots; quadratic reciprocity. Number-theoretic functions and the distribution of primes. Diophantine problems. Rational approximations to real numbers.

MATH 516. *Introduction to Functional Analysis.* ♦6 (3-0). Metric spaces: Contraction mappings, Baire's theorem, Equicontinuity, Ascoli's theorem. Banach spaces: Linear functionals, dual space, Hahn-Banach theorem; uniform boundedness principle, open mapping theorem, closed graph theorem; weak and weak* topology; representation of linear functionals in special spaces; selected examples. Hilbert spaces: Orthogonality, orthonormal sets, Bessel's inequality, Parseval's formula; compact symmetric operators. Additional topics at the discretion of the instructor. Prerequisites: Mathematics 440 and 410, or consent of the Department.

MATH 520. *Differential Geometry.* ♦6 (3-0). Survey of classical differential geometry. Curvature of curves and surfaces. Synthetic differential geometry. Axiomatic treatment of topological and general metric spaces. Applications to non-Euclidean, Riemannian, Finsler and Busemann spaces.

MATH 522. *Partial Differential Equations.* ♦6 (3-0). First Order Equations. Classification of higher order equations. Integral transform method of solutions. Elements of potential theory. The wave equation in 1, 2, and 3 space dimensions. The heat equation. Integral equations including the Fredhalm Theory and the Hilbert-Schmidt theory. Applications of integral equations to boundary value and eigenvalue problems. Prerequisite: Mathematics 421 or consent of the Department.

MATH 530. *Theory of Approximation.* ♦6 (3-0). Polynomial interpolation and the general remainder theorem. Weierstrass theorem and best approximation. Approximation in $L^2$ and $L^1$ norm. Müntz theorem. Degree of approximation by trigonometric polynomials. Degree of rational approximation. Approximation by linear polynomial operators. Prerequisite: Mathematics 426 and Mathematics 440 or consent of the Department.

MATH 541. *Real Variables II.* ♦6 (3-0). Prerequisite: Mathematics 440 or consent of the Department.

MATH 550. *Generalized Dynamics and Special Relativity Theory.* ♦6 (3-0).

MATH 554. *Theory of Elasticity.* ♦6 (3-0). Stress, strain, stress-strain relations. Stretching, bending, torsion, and flexure of cylinders. Two-dimensional problems with an introduction to the work of Muskelvili. Introduction to three-dimensional problems. Variational methods. Prerequisite: Mathematics 408 or 426 or 500 or consent of the Department.

MATH 555. *Hydro- and Aero-dynamics.* ♦6 (3-0). Classical hydrodynamics. Kutta-Joukowski theory of airfoils. Boundary layers. Flow of a viscous fluid. Supersonic flow. Shock waves.

MATH 580. *Tensor Analysis.* ♦6 (3-0). Algebra of tensors. Covariant differentiation. Applications of tensorial methods to the geometry of curves and surfaces, analytical dynamics, elasticity, the special and general theories of relativity, and cosmology.

MATH 600. *Analysis.* ♦6 (3-0). Linear transformations. Orthogonal functions. Integral equations. Eigenvalue problems. Special functions, including Bessel, Legendre, and Tchebycheff functions. Asymptotic expansions.

MATH 601. *Theory of Fields.* ♦6 (3-0). Galois theory. Structure of fields. Valuation theory.

MATH 604. *Measure Theory.* ♦6 (3-0).

MATH 605. *Mathematical Logic.* ♦4 (2-0). Sentential calculus; lower predicate calculus; Boolean algebra, structures, Goedel's completeness theorem.

MATH 610. *Calculus of Finite Differences.* ♦6 (3-0). Introduction to the properties of difference operators, with application to the solution of linear difference equations.

MATH 615. *Integral Equations.* ♦6 (3-0). Linear integral equations. Applications of general theory to the equations of Abel, Fredholm, and Volterra.

MATH 616. *Topics in Functional Analysis.* ♦6 (3-0). Selected chapters from the theory of linear spaces and operators, harmonic analysis, spectral theory and applications. (The content may vary from time to time.) Prerequisite: Mathematics 516 or equivalent or consent of the Department.

MATH 620. *Advanced Complex Analysis.* ♦6 (3-0). Geometrical aspects of the theory of functions of a complex variable. Conformal mapping. Riemann surfaces. Representation of analytic functions. Problems of convergence. (Topics may vary from year to year.) Prerequisite: Mathematics 500 or 501 or equivalent.

MATH 621. *Ordinary Differential Equations (Advanced).* ♦6 (3-0). Existence and uniqueness theorems; dependence of solutions on parameters and on initial conditions. Linear differential equations. Linear systems with isolated singularities of the first and second kind. Asymptotic behaviour of nonlinear systems; stability. Prerequisite: Mathematics 421 or equivalent.

MATH 624. *Combinatorial Analysis.* ♦ (3-0). Recurrence relations and generating series for combinatorial problems. Partitions and compositions. Trees and graphs. Ramsey's Theorem. Zero-one matrices and combinatorial designs.

MATH 625. *Analytical Number Theory.* ♦6 (3-0). Analytic theory of the distribution of primes. The Selberg-Erdös method. Distribution of power residues. Analytic methods in combinatorial problems and in additive number theory. Prerequisite: Mathematics 515.

MATH 630. *General Topology.* ♦6 (3-0). Topologies, neighbourhoods, closed sets, accumulation points, bases, subbases, relativization, separation. Connectedness. Nets and filters. Continuity, homeomorphism. Product and other related topologies. Embedding and metrization, axioms of countability, separation axioms. Compactness. Compactifications. Quasi-uniform and uniform spaces, completion. Function spaces. Equicontinuity.

MATH 631. *Algebraic Topology.* ♦6 (3-0). Combinatorial topology of surfaces; mapping and fixed point theorems; covering spaces; homology theory and Betti-groups; connectivity.

MATH 645. *Lattice Theory.* ♦6 (3-0). Partially ordered sets, lattices and complete lattices. Graphs of finite lattices. Distributive and modular lattices. Complemented lattices. Boolean rings. Generalized projective geometry and continuous geometry. Prerequisite: Mathematics 425 or equivalent, and consent of the Department.

MATH 650. *Elementary Seminar.* (2-0). Note: Compulsory for and restricted to first year provisional Ph.D. students in Mathematics. The topics will vary from year to year.

MATH 670. *Topics in Algebra.* ♦6 Prerequisite: Consent of the Department.

MATH 671. *Topics in Analysis.* ♦6 Prerequisite: Consent of the Department.

MATH 672. *Topics in Geometry.* ♦6 Prerequisite: Consent of the Department.

MATH 673. *Topics in Applied Mathematics.* ♦6 Prerequisite: Consent of Department.

MATH 675. *Topics in Differential Equations.* ♦6 (3-0).

MATH 691. *Group Theory.* ♦6 (3-0).

MATH 695. *Advanced Relativity Theory.* ♦6 (3-0).

### 204.40.5 / GRADUATE COURSES: STATISTICS

STAT 560. *Estimation and Statistical Hypotheses.* ♦6 (3-0). Cramér-Rao inequality; Bhattacharya bounds; sufficiency and completeness; minimax and Bayes estimates based on order statistics. Neyman-Pearson theory; similar regions; least-favorable distributions; principle of invariance; unbiased tests; non-parametric theory.

STAT 562. *Theory of Games.* ♦4 (2-0). Games in normal and extensive form. Methods of solution. Statistical games. Minimax strategies. Bayes procedures. Linear programming.

STAT 564. *Analysis of Variance.* ♦6 (3-0). Point estimation. Confidence ellipsoids and tests under normal theory. The one-way layout. Multiple comparisons: the complete two-, three-, and higher-way layouts. Partitioning of a sum of squares. Latin squares. Incomplete blocks and nested designs. The analysis of co-variance. Random effects models.

STAT 565. *Mathematical Methods of Statistics.* ♦5 (First Term 2-0, Second Term 3-0). Foundations. Axioms of a probability space. Dependence and independence. Random variables and probability distributions. Characteristic functions. First and second Central Limit Theorems. Exact sampling distributions. Regression and correlation Elements of statistical inference.

STAT 570. *Probability Theory and Applications.* ♦4 (2-0). Limit theorems for random variables. Random walks and recurrent events. Applications to Markov chains and selected statistical problems.

STAT 660. *Stochastic Processes.* ♦6 (3-0).

STAT 674. *Topics in Statistics.* ♦6. Prerequisite: Consent of the Department.

### 204.40.6 / GRADUATE COURSES: PHYSICS

NOTE: The following courses are given in the Physics Department. Some of these may be selected as part of a graduate program in Mathematics.

PHYS 680. *Advanced Quantum Mechanics.* ♦6 (3-0).

PHYS 682. *Advanced Electromagnetic Theory.* ♦6 (3-0).

PHYS 685. *Advanced Statistical Mechanics.* ♦6 (3-0).

PHYS 688. *Advanced Solid State Theory.* ♦6 (3-0).

PHYS 690. *Quantum Theory.* ♦6 (3-0).

PHYS 692. *Group Theory and Applications.* ♦6 (3-0).

PHYS 697. *Nuclear Structure.* ♦6 (3-0).

PHYS 699. *Selected Topics in Theoretical Physics.* ♦4 (2-0).

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## 204.41 / *Mechanical Engineering*

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### 204.41.1 / THE DEGREES OF M.ENG., M.SC. AND PH.D.

(1) The Department of Mechanical Engineering offers postgraduate courses and provides research facilities for well-qualified students of recognized universities who wish to take advanced degrees leading to the M.Eng., M.Sc., and Ph.D. Areas of study include Applied Mechanics, Thermodynamics, Fluid Mechanics, Gas Dynamics, Heat Transfer, and Combustion Engineering.

(2) The normal requirement for a Master of Engineering program is credit in courses with a total weight of thirty units, fifteen of which must be in the candidate's major field, plus a project equivalent to three units. A candidate may complete a Master of Engineering program in a minimum of nine months. The minimum residence required is one term for a B.Sc. graduate with at least one year of post-B.Sc. experience, and one

session for a B.Sc. graduate with less than one year of post-B.Sc. experience. The maximum time permitted for completion of a Master of Engineering program is five years from the date of first registration.

(3) For the Master of Science program credit must be obtained in courses with a total weight of twenty-four units, twelve of which must be in the candidate's major field, plus a thesis equivalent to twelve units.

(4) For the Ph.D. program, all requirements of the Faculty of Graduate Studies must be met. In addition the Department normally requires that the candidate must have satisfactorily completed approved courses in a major field and at least one minor field. The minimum requirements after a Bachelor's degree are courses with a total weight of forty-eight units, twenty-four of which must be in the major field, plus research leading to a thesis of high calibre. For those students entering the Ph.D. program after a Master's degree the minimum course requirement is twenty-four units. As part of the requirements for admission to candidacy for the Ph.D. the provisional candidate may have to pass departmental comprehensive examinations (either oral or written) embracing the major field which will be arranged in consultation with the Department. Candidates must also satisfy the Department that they have a reading knowledge in either German or Russian.

(5) Financial assistance is available through part-time teaching and research assistantships. Limited travel grants are available to teaching and research assistants.

## 204.41.2 / UNDERGRADUATE COURSES

The following may be taken for graduate credit:

MEC E 436. *Aerodynamics of Compressible Flow.* ♦3 (Second Term, 3-0) Instructor: D. J. Marsden.

MEC E 440. *Energy Conversion.* ♦3 (Second Term, 3-0). Instructor: G. S. H. Lock.

MEC E 445. *Analytical Thermodynamics.* ♦3 (First Term, 3-0). Instructor: G. S. H. Lock.

MEC E 452. *Mechanical Vibrations.* ♦3 (First Term, 3-0). Instructor: J. S. Kennedy.

MEC E 471. *Heat Transfer II.* ♦3 (Second Term, 3-0). Instructor: C. M. Rodkiewicz.

MEC E 485. *Mechanics of Solids.* ♦3 (Second Term, 3-0). Instructor: J. B. Haddow.

## 204.41.3 / GRADUATE COURSES

MEC E 500. *Design Project.* ♦0 (Time equivalent to one half-course). Detailed Engineering report in the student's major area of interest.

MEC E 520. *Advanced Combustion Engineering.* ♦3 (First Term, 2-3/2). Detailed study of combustion in engines. Examination of theories of ignition, flame propagation and detonation. Special test on gas turbine and variable compression C.F.R. Engine.

MEC E 521. *Advanced Combustion Engineering (Design).* ♦3 (Second Term, 2-3/2). Study of design problems in combustion engines. Effects of operating and design factors on performance. Design of gas turbines and internal combustion components.

MEC E 530. *Introduction to Viscous Laminar Flow Theory.* ♦3 (First Term, 3-0). Laminar incompressible flow; simple exact solutions; the low Reynolds number range; the large Reynolds number range; approximate methods. Instructor: C. M. Rodkiewicz.

MEC E 535. *Gas Dynamics.* ♦3 (First Term, 3-0). Equations of motion. Isentropic flow with discontinuities. Flow with friction. Flow with heating or cooling, small perturbation method for subsonic and supersonic flow. Oblique shocks. Methods of characteristics. Unsteady motion in one direction. Instructor: C. M. Rodkiewicz.

MEC E 536. *Aerodynamics of Rarefied Gases.* ♦3 (Second Term, 3-0). Molecular scattering; Boltzmann's Equation, the Maxwell Boltzmann Distribution Function; transport properties of a rarefied gas; momentum and energy exchange at a solid surface; accommodation coefficients; applications. Instructor: D. J. Mardsen.

MEC E 540. *Thermodynamics.* ♦3 (First Term, 3-0). Advanced macroscopic thermodynamic techniques. Kinetic theory, statistical mechanics and information theory as applied to thermodynamics of the pure component and of the mixtures. Thermodynamics of irreversible phenomena. Instructor: G. S. H. Lock.

MEC E 550. *Dynamics of Structures.* ♦3 (Second Term, 3-0). Behavior of elastic structures subjected to dynamic loads. Vibrations of buildings and bridges excited by machinery, earthquakes, wind and traffic. Instructor: J. S. Kennedy.

MEC E 570. *Conduction Heat Transfer.* ♦3 (First Term, 3-0). General diffusion equation. Steady and transient one-dimensional and quasi-one-dimensional systems. Multi-dimensional systems. Special methods. Instructor: G. W. Sadler. Textbook: Arpaci, *Conduction Heat Transfer.*

MEC E 572. *Laminar Convection.* ♦3 (Second Term, 3-0). General theory of convection systems. Forced and free convection for laminar conditions. Internal and external flows. Instructor: G. S. H. Lock.

MEC E 573. *Turbulent Convection.* ♦3 (Second Term, 3-0). Origin and mechanisms of turbulence. Theory of turbulent convective systems. Turbulent convection near solid boundaries. Jets and wakes. Instructor: G. S. H. Lock.

MEC E 575. *Thermal Radiation.* ♦3 (Second Term, 3-0). Principles of radiant energy transfer. Gaseous radiation. Spectral characteristics. Geometrical characteristics of systems involving thermal radiation. Electrical analogy. Instructor: G. W. Sadler. Textbook: Hottel and Sarofim, *Radiative Transfer.*

MEC E 580. *Theory of Elasticity.* ♦3 (First Term, 3-0). Classical and tensorial approach to theoretical elasticity. Two and three dimensional problems, torsion, variational and energy methods. Instructor: D. G. Bellow. Textbooks: Timoshenko and Goodier, *Theory of Elasticity;* Sokolnikoff, *Mathematical Theory of Elasticity.*

MEC E 581. *Theory of Elastic Stability.* ♦3 (Second Term, 3-0). Classical stability analysis of bars and plates subjected to various loading conditions. Energy methods. Dynamic stability of non-conservative force systems and the effects of internal friction. Inelastic buckling, torsional buckling. Instructor: D. G. Bellow. Textbook: Timoshenko and Gere, *Theory of Elastic Stability.*

MEC E 582. *Theory of Plates.* ♦3 (First Term, 3-0). Plate equation in rectangular and polar coordinates. Solution of plate equations under various loads. Special plate problems. Instructor:

K. C. Cheng. Textbook: Timoshenko and Woinowsky-Krieger, *The Theory of Plates and Shells.*

MEC E 583. *Theory of Shells.* ♦3 (Second Term, 3-0). Membrane and bending theory of shells of revolution. Membrane theory of shells of arbitrary shape. Instructor: J. R. Colbourne. Textbook: Flügge, *Stresses in Shells.*

MEC E 585. *Theory of Plasticity.* ♦6 (3-0). Basic laws of stress and strain. Theories of strength. Plastic stress-strain relations. Problems in plastic flow of ideally plastic materials and of strain hardening materials. Applications to metal forming. Instructor: J. B. Haddow. Textbook: Hill, *Mathematical Theory of Plasticity.*

### 204.41.4 / READING PROJECTS

Credit will be allowed up to a maximum course weight of six units in any one project.

MEC E 630. *Continuum Mechanics.*
MEC E 635. *Gas Dynamics.*
MEC E 636. *Rarefied Gas Dynamics.*
MEC E 650. *Vibrations.*
MEC E 670. *Conduction.*
MEC E 672. *Convection.*
MEC E 680. *Elasticity.*
MEC E 682. *Plates.*
MEC E 683. *Shells.*
MEC E 685. *Plasticity.*

## 204.42 / *Medicine*

### 204.42.1 / THE DEGREE OF M.SC.

(1) The Department of Medicine offers the Degree of M.Sc. in Experimental Medicine either as part of a co-ordinated pattern of training leading to fulfilment of requirements for graduate training in the medical specialties, or as a separate program for those proceeding from a B.Sc.

(2) Research may be carried out in Anatomy, Physiology, Pharmacology, or allied disciplines applied to problems encountered in clinical investigation or management of patients and their diseases, or in purely experimental work related to these fields.

(3) Such course work is required as may be necessary for the proper understanding and carrying out of the research work and preparing the dissertation. Advanced credit may be granted in appropriate cases for courses taken during the latter years of the M.D. program, at the discretion of the candidate's supervisor.

(4) For candidates holding the M.D., the program's minimum requirement would be one calendar year of residence. For other candidates a qualifying year may be required.

(5) Limited financial assistance is available to support these programs, but applications should be made at least twelve months in advance.

(6) Inquiries should be directed to the head of the Department of Medicine, University Hospital.

## 204.43 / *Meteorology*

### 204.43.1 / THE DEGREE OF M.SC.

(1) The Department of Geography offers two separate programs leading to the M.Sc. degree with specialization in Meteorology. Prerequisite to either program is an Honors B.Sc. degree or equivalent with adequate preparation in Mathematics and Physics.

(2) The program of studies for the degree of M.Sc. (Geography) with specialization in Meteorology requires four courses in Meteorology and Climatology. These should include Meteorology 405 and 511, and Geography 503. If the candidate has no course in Statistics, he should also include an introductory course in this field. The program is designed for students who wish to apply a knowledge of Meteorology to some allied field. Prospective candidates should write and inquire of the Department stating their interests and their background.

(3) A second program leading to an M.Sc. (Meteorology) degree, given with the co-operation of the Meteorology Branch, Department of Transport, requires twenty months of study. To be admitted to this program, a student must have an Honors degree in Mathematics or Physics, or its equivalent. The first academic year will include Meteorology 405, 511, 512, 513, 515; Geography 503; a course in Statistics; and a seminar. There will be no language requirement for this degree. During the second year a student will take Meteorology 525, 505, or other acceptable course, and prepare a thesis.

### 204.43.2 / UNDERGRADUATE COURSE

The following may be taken for graduate credit:

MET 405. *Introduction to Theoretical Meteorology.* ♦6 (3-3). E. R. Reinelt.

### 204.43.3 / GRADUATE COURSES

MET 505. *Reading and Seminar Course in Meteorology.* ♦6.

MET 511. *Synoptic Meteorology.* ♦6 (3-3). E. R. Reinelt.

MET 512. *Synoptic Meteorology Laboratory.* ♦4 (0-4-0). E. R. Reinelt.

MET 513. *Physical Meteorology.* ♦4 (2-2). R. W. Longley.

MET 515. *Meteorological Statistics.* ♦3 (Second Term, 3-0). K. D. Hage.

MET 525. *Advanced Topics in Dynamic Meteorology.* ♦6 (3-3). K. D. Hage.

MET 555. *Research in Meteorology.* ♦6.

## 204.44 / *Microbiology*

### 204.44.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Microbiology offers programs leading to the Master of Science and Doctor of Philosophy degrees.

(2) Research in the Department is currently being conducted in such areas as enzyme purification and kinetics, enzyme synthesis and regulatory mechanisms, biosynthesis of vitamins and antibiotics, viral and bacterial ultra-structure, microbial and mammalian virus replication.

(3) Students may enter the graduate program with degrees in Biochemistry, Chemistry, Genetics, Pharmacy, or Agriculture, but will be required to take several Microbiology courses to complete their background wherever deficiencies exist.

(4) Courses offered by the Department of Microbiology will be augmented by suitable courses from other departments (for example, Biochemistry, Chemistry, and Genetics) to develop a graduate program appropriate to each applicant's interest and background. A research thesis topic will be chosen only after consultation with all faculty members in the Department.

(5) Teaching and research assistantships, as well as financial assistance from research grants to faculty members, are available for most qualified candidates.

(6) Further information is available through inquiry to the head of the Department.

### 204.44.2 / GRADUATE COURSES

MICRB 503. *Research.* ♦6 (0-6). Directed studies and supervised laboratory experiments. Note: Primarily for senior honors and qualifying graduate students.

MICRB 505. *Intermediary Metabolism.* ♦3 (First Term, 3-0). A detailed description of enzymatic reactions in biosynthetic pathways of carbohydrate, amino acid, vitamin and coenzyme metabolism. Interrelationships between metabolic pathways and some non-microbial systems.

MICRB 506. *Cellular Control Mechanism.* ♦3 (Second Term, 0-6). The design and operation of laboratory procedures employed to generate current concepts in research. Note: Students require a comprehension of metabolic processes equivalent to MICRB 505.

MICRB 507. *Graduate Seminar.* ♦6 (3-0). Required each year of all graduate students. Credit will be given when a satisfactory standard is attained.

MICRB 508. *Recent Developments in Virology.* ♦3 (First Term, 3-0).

MICRB 510. *Structure of Micro-organisms.* ♦3 (Second Term, 3-3).

MICRB 515. *Biosynthesis of Fungal Metabolites.* ♦3 (First Term, 3-0).

## 204.45 / *Mining and Metallurgy*

### 204.45.1 / THE DEGREES OF M.ENG., M.SC., AND PH.D.

(1) The Department of Mining and Metallurgy offers graduate work in the fields of Mineral Dressing, Hydrometallurgy, Pyrometallurgy and Physical Metallurgy. Graduate programs in these fields, leading to the degrees of M.Sc. and Ph.D. in Metallurgy and M.Sc. and Ph.D. in Metallurgical Engineering, and Master of Engineering may be arranged.

(2) The Department is well equipped, and has available a variety of research projects suitable for studies at the master's or doctoral level.

(3) Graduates in the basic Sciences or Engineering are eligible to apply for registration in these programs in Metallurgy or Metallurgical Engineering.

(4) Graduate programs at the M.Sc. level are available in Mining Engineering.

(5) Graduates in Engineering are eligible to apply for registration in the Master of Engineering programs offered in either Metallurgical Engineering or Mining Engineering. This is a new graduate program in Mining Engineering and Metallurgical Engineering.

(6) The Master of Engineering programs normally consist of ten one-term courses plus a project which will take at least one full month to complete. A candidate may complete a Master of Engineering program in a minimum of nine months. The minimum residence required is one term for a B.Sc. graduate with at least one year of post B.Sc. experience and one session for a B.Sc. graduate with less than one year of post B.Sc. experience. The maximum time permitted for completion of a Master of Engineering program is five years from the date of first registration.

### 204.45.2 / GRADUATE COURSES

The following courses may be offered in either the First or the Second Term, but the Department reserves the right to give only those for which a sufficient number of students register.

*Metallurgy*

MET E 500. *Design Project.*

MET E 502. *Advanced Crystallography.*

MET E 503. *Corrosion.*

MET E 506. *Research Techniques in Metallurgy.*

MET E 507. *Lattice Imperfections and the Mechanical Behavior of Solids.*

MET E 508. *Special Topics in Metallurgical Thermodynamics and Kinetics.*

MET E 509. *Theory of Alloy Phases.*

MET E 510. *Special Topics in Process Metallurgy.*
MET E 511. *Special Topics in Physical Metallurgy.*

*Mining*

ME 500. *Design Project.*
ME 504. *Rock Mechanics.*

## 204.46 / *Music*

### 204.46.1 / THE DEGREE OF M.MUS.

(1) The Department of Music offers the degree of Master of Music in the following areas of concentration: Applied Music (Piano, Violin, Viola and Cello); Composition; Music History and Literature; Music Theory.

(2) The entrance requirement is a B.Mus. degree or equivalent. Placement tests will be given to students holding bachelor's degrees from other institutions.

(3) The program of study in Applied Music will include private instruction in the major instrument, class instruction in ensemble, one option in Music Theory, one option in Music History and Literature, and a special project leading to an essay on a subject closely allied to the applied music major. Performance requirements include a solo recital and when recommended by the Department, a solo performance with orchestra.

(4) The program of study in Composition will include courses in the History of Music Theory, Analytical Techniques in twentieth century music, Pedagogy of Theory, an approved option at the 500 level, and a special project leading to a thesis. The thesis will consists of a major composition, either instrumental or vocal.

(5) The program of study in Music Theory will be the same as that outlined for Composition. The thesis will be an intensive investigation of a specific area or problem in music theory.

(6) The program of study in Music History and Literature will include a seminar in Music History and Literature, Collegium Musicum, courses in Music Theory and Music History and Literature, and a special project leading to a thesis. The thesis will be an intensive investigation of a specific area or problem in music history and literature.

(7) The program requires one calendar year—Winter and Summer Session.

(8) Prospective applicants may apply for graduate teaching assistantships or graduate service assistantships—each with a value of $3,000. Intersession bursaries to the amount of $1,000 are also available for summer study.

(9) Application forms and calendars can be obtained from the Dean of Graduate Studies. Applications should be received by April 1. For further information, write directly to the Chairman of the Graduate Committee, Department of Music.

### 204.46.2 / UNDERGRADUATE COURSES

The following may be taken for graduate credit:

MUSIC 404. *Instrumental Techniques (Strings).* ♦6 (3L).
MUSIC 410. *Music of the Baroque.* ♦6 (3-0).
MUSIC 427. *Piano Literature and Pedagogy.* ♦4 (2-1).
MUSIC 428. *Vocal Accompanying.* ♦2 (1L).
MUSIC 461. *Orchestration.* ♦4 (2-0)
MUSIC 510. *Notation of Medieval Music.* ♦4 (2-0).
MUSIC 527. *Piano Literature and Pedagogy.* ♦4 (2-1).
MUSIC 528. *Choral and Organ Literature.* ♦4 (2-0).
MUSIC 532. *Music in the Western Church.* ♦6 (3-0).
MUSIC 561. *Orchestration.* ♦4 (2-0).
MUSIC 552. *Counterpoint (Sixteenth Century).* ♦4 (2-0).
MUSIC 553. *Advanced Harmony and Fugue.* ♦4 (2-0).
MUSIC 554. *Score Reading and Orchestral Literature.* ♦4 (2-0).
MUSIC 555. *Conducting.* ♦4 (2-0).
MUSIC 570. *Aural Theory.* ♦4 (2-0).
MUSIC 571. *Choral and Band Arranging.* ♦4 (2-0).

### 204.46.3 / GRADUATE COURSES

MUSIC 602. *History of Music Theory.* ♦4 (2-0).
MUSIC 610. *Seminar in Music History & Literature.* ♦4 (2s).
MUSIC 612. *Collegium Musicum.*♦2 (1-0).
MUSIC 625. *First Practical Subject.* ♦4 (2-0).
MUSIC 627. *Pedagogy of Music Theory.* ♦4 (2-0).
MUSIC 612. *Collegium Musicum.* ♦2 (1-0).
MUSIC 629. *Ensemble.* ♦4 (2L).
MUSIC 650. *Analytical Techniques in Twentieth-Century Music.* ♦4 (2-0).

## 204.47 / *Paediatrics*

### 204.47.1 / THE DEGREE OF M.SC.

(1) Facilities exist within the Department of Paediatrics for students who wish to proceed to the Master of Science Degree.

(2) Inquiries should be directed to the Head of the Department of Paediatrics, University Hospital.

## 204.48 / *Pathology*

### 204.48.1 / THE DEGREE OF M.SC.

(1) The Department of Pathology provides a program leading to the degree of Master of Science in Medical Laboratory Science.

(2) Holders of a B.Sc. in Medical Laboratory Science or related scientific subjects,

or of an M.D. or its equivalent in Medicine, can enter this program. Prerequisite courses can be specified only at the time when the individual candidate is arranging his program, although some biological sciences, particularly Microbiology, Biochemistry, and Physiology, should have been studied.

(3) The requirements for the degree include course work, seminars, and an approved research project. Holders of a B.Sc. normally require two years, and holders of an M.D. normally require one year, to complete their program.

(4) Approved courses offered by the Departments of Anatomy, Biochemistry, Physiology, Pharmacology, and Plant Science may be included in the candidate's program. In certain circumstances courses offered by other departments may be approved.

(5) Inquiries should be directed to the head of the Department of Pathology.

### 204.48.2 / GRADUATE COURSES

PATHOL 501. *Cellular and Tissue Structure and General Mechanisms of Disease.* ♦6 (3-2).
PATHOL 502. *Reticuloendothelial System and Immunity.* ♦3 (First Term, 3-0). G. O. Bain.
PATHOL 503. *Advanced Hematology.* ♦3 (Second Term, 3-0). R. E. Bell and staff.
PATHOL 504. *Seminars on General Pathology.* ♦1 (First Term, 1-0).
PATHOL 505. *Fundamentals of Histochemistry.* ♦1 (First Term, 1-2). T. K. Shnitka.
PATHOL 610. *Subcellular Morphology.* ♦2 (Second Term, 2-0). T. K. Shnitka.

## 204.49 / *Pharmacology*

### 204.49.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Pharmacology offers graduate programs leading to the degrees of Master of Science and Doctor of Philosophy in Pharmacology.

(2) The Department's research emphasizes both physiological and biochemical approaches to the pharmacology of smooth muscle, and the nervous and cardiovascular system. Techniques available include electrophysiological recording, radioactive tracers, spectrophotometric assays, photofluorometric assays, isolation of cell fractions and chemical syntheses. In addition, training in Clinical Pharmacology is offered in conjunction with the Department of Medicine and the University Hospital.

(3) Graduate studies in Pharmacology may be of interest to candidates with degrees in general biology, psychology, physics, chemistry, biochemistry, physiology, bacteriology, pharmacy, medicine and dentistry. Prerequisite courses will be specified at the time of arrangement of the candidate's program.

(4) The time required for completion of graduate programs will vary with previous training of the individual and will ordinarily be less for those entering with an honors degree or a degree in Medicine or Dentistry.

(5) Graduate and undergraduate courses offered by other departments may be included in a candidate's program by arrangement between the departments concerned.

(6) Financial support of the candidate can be arranged. Teaching and Research Fellowships are available to graduate students; applications for these should be received before March 15 of each year.

(7) Inquiries should be directed to the head of the Department of Pharmacology.

### 204.49.2 / ADVANCED STUDY IN PHARMACOLOGY

(1) A special program has been arranged for graduates in Medicine wishing to spend an additional year in a basic science department. This program does not lead to a degree, but may satisfy some of the course requirements should the student wish to proceed to a master's degree.

(2) The program includes graduate courses, a weekly seminar, duties as a class laboratory demonstrator, participation in a research project, and optional attendance at undergraduate lectures.

(3) Those wishing to undertake this program should register as special students in the Faculty of Medicine.

### 204.49.3 / GRADUATE COURSES

PMCOL 501. *Pharmacology Tutorial and Reading Course.* ♦3 (Second Term, 3-0). Note: Given every other year.
PMCOL 508. *Molecular Pharmacology.* ♦3 (Second Term, 3-0). The relationship between chemical structure and pharmacological activity. Cellular pharmacology and receptor theory. Prerequisite: Biochemistry 300. Note: Given every other year.
PMCOL 509. *Neuropharmacology.* ♦3 (First Term, 3-0). Pharmacological aspects of autonomic transmitter substances. The actions of drugs on skeletal muscle and neuromuscular transmission. Prerequisite: Physiology 411. Note: Given every other year.
PMCOL 510. *Methodology in Pharmacology.* ♦6 (1-3). Prerequisites: Pharmacology 421 or Pharmacology 431.
PMCOL 600. *Seminar in Pharmacology.* ♦1 (Second Term, 1s-0).
PMCOL 601. *The Actions of Drugs on Membrane Potentials and Ion Fluxes of Smooth Muscle.* ♦3 (Second Term, 3-0). Prerequisite: Pharmacology 421 or Pharmacology 431. Note: Given every other year.
PMCOL 602. *Research Methods in Clinical Pharmacology.* ♦3 (0-4). Note: Only students with the M.D. degree can be accepted in this course.

## 204.50 / *Pharmacy*

### 204.50.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Faculty of Pharmacy offers programs leading to the Master of Science and Doctor of Philosophy degrees and can accommodate a limited number of graduate students in modern well-equipped laboratories.

(2) Research may be undertaken in fields such as pharmaceutical chemistry, physical pharmacy, manufacturing pharmacy, biopharmacy, pharmacognosy, pharmaceutics, biopharmaceutics, and biochemical studies with radioactive tracers.

(3) Individuals with previous degrees in such fields as Pharmacy, Biology, or Chemistry will be considered.

(4) Financial assistance is available from the Canadian Foundation for the Advancement of Pharmacy, and from other sources.

(5) Prospective candidates should consult with the Dean regarding the requirements.

### 204.50.2 / UNDERGRADUATE COURSES

The following may be taken for graduate credit:

PHARM 440. *Advanced Pharmaceutical Analysis.* ♦6 (3-0). R. T. Coutts.
PHARM 441. *Advanced Pharmaceutical Analysis Laboratory.* ♦2 (1s-3). R. T. Coutts.
PHARM 442. *Advanced Pharmaceutics.* ♦2 (1-0). J. N. Hlynka.
PHARM 443. *Advanced Pharmaceutics Laboratory.* ♦6 (0-3). J. N. Hlynka.
PHARM 482. *Antimicrobial Drugs.* ♦3 (First Term, 3-0). G. E. Myers.
PHARM 483. *Antimicrobial Drugs Laboratory.* ♦3 (First Term, 0-3). G. E. Myers.
PHARM 484. *Biological Products.* ♦3 (Second Term, 3-0). G. E. Myers.
PHARM 485. *Biological Products Laboratory.* ♦3 (Second Term, 0-3). G. E. Myers.

### 204.50.3 / GRADUATE COURSES

PHARM 501. *Isotope Tracer Methodology.* ♦3 (First Term, 3-3). A. A. Noujaim and G. L. Waszilycsak.
PHARM 502. *Advanced Isotope Tracer Methodology.* ♦3 (Second Term, 3-3). A. A. Noujaim.
PHARM 503. *Medical Application of Radioisotopes.* ♦3 (Second Term, 3-0). A. A. Noujaim and G. L. Waszilycsak.
PHARM 505. *Radiation Biology.* ♦3 (Second Term, 3-3). G. L. Waszilycsak and A. A. Noujaim.
PHARM 510. *Advanced Physical Pharmacy.* ♦3 (First Term, 3-4). N. K. Patel.
PHARM 511. *Pharmaceutical Formulation and Development.* ♦3 (Second Term, 3-4). N. K. Patel.
PHARM 520. *Structure-Action Relationships of Organic Medicinals.* ♦3 (First Term, 3-0). L. G. Chatten.
PHARM 521. *New Synthetic Organic Compounds with Promising Pharmacological Activities.* ♦3 (Second Term, 3-0). R. E. Moskalyk.
PHARM 522. *Phytochemistry.* ♦3 (First Term, 3-0). R. A. Locock.
PHARM 523. *Medicinal Macromolecules.* ♦3 (Second Term, 3-0). R. T. Coutts.
PHARM 524. *Applications of Nuclear Magnetic Resonance Spectroscopy to Medicinal and Pharmaceutical Chemistry.* ♦3 (First Term, 3-0). A. F. Casy.
PHARM 525. *Stereochemical Aspects of Medicinal and Pharmaceutical Chemistry.* ♦3 (Second Term, 3-0). A. F. Casy.
PHARM 599. *Graduate Seminar.* ♦2 (1s-0).

## 204.51 / *Philosophy*

### 204.51.1 / THE DEGREES OF M.A. AND PH.D.

(1) The Department offers programs leading to the Master of Arts and Doctor of Philosophy degrees.

(2) Advanced work may be pursued in any of the following: Ethics, Aesthetics, Social Philosophy, History of Philosophy, Logic and Scientific Method, Philosophy of Language and Metaphysics.

(3) Applicants for a one year M.A. program in Philosophy must have completed training equivalent to that of graduates with honors in Philosophy from this Department. Applicants for a two-year M.A. program should consult the Department for assessment of the quantity and quality of their undergraduate training in philosophy.

(4) Graduate students in Philosophy may compete for the general graduate scholarships listed in the Awards section of the Calendar and for graduate teaching assistantships and graduate service assistantships available within the Department.

### 204.51.2 / GRADUATE COURSES

PHIL 502. *Plato.* ♦6 (3-0).
PHIL 504. *Aristotle.* ♦6 (3-0).
PHIL 506. *Thomas Aquinas.* ♦6 (3-0).
PHIL 510. *Hegel.* ♦6 (3-0).
PHIL 512. *Marx and Marxism.* ♦6 (3-0).
PHIL 514. *Kierkegaard.* ♦6 (3-0).
PHIL 516. *Wittgenstein.* ♦6 (3-0).
PHIL 520. *Problems in Philosophy.* ♦6 (3-0).
PHIL 522. *Moral Philosophy.* ♦6 (3-0).
PHIL 524. *Political and Social Philosophy.* ♦6 (3-0).
PHIL 526. *Philosophy of Art.* ♦6 (3-0).
PHIL 528. *Philosophy of History.* ♦6 (3-0).
PHIL 536. *Contemporary Phenomenology.* ♦6 (3-0).
PHIL 548. *Conference Course.* ♦6 (3-0).
PHIL 554. *Theory of Value.* ♦6 (3-0).
PHIL 556. *The Philosophy of Kant.* ♦6 (3-0).
PHIL 558. *The Philosophy of Religion.* ♦6 (3-0).
PHIL 560. *Logic.* ♦6 (3-0).
PHIL 566. *Theory of Knowledge.* ♦6 (3-0).
PHIL 568. *Philosophy of Mind.* ♦6 (3-0).
PHIL 570. *Philosophy of Language.* ♦6 (3-0).
PHIL 678. *Reading Course.* ♦6 (3-0). Note: Open only to provisional candidates for the Ph.D.
PHIL 679. *Research Seminar.* ♦4 (2-0). Note: Required of all graduate students beyond the qualifying year.

# 204.52 / *Physical Education*

## 204.52.1 / THE DEGREES OF M.A., M.SC. AND PH.D.

(1) The Faculty of Physical Education offers programs leading to the degrees of Master of Arts, Master of Science, and Doctor of Philosophy.

(2) Well equipped facilities are available for a limited number of graduate students. Areas of specialization include: administration, physiology of exercise, sociology, motor performance, and history.

(3) Requirements for admission conform with the general regulations of the Faculty of Graduate Studies.

(4) The normal requirements, in addition to the thesis, are four to six courses for the M.A. or M.Sc. degree. Course requirements for the Ph.D. program depend upon individual circumstances and must be approved by the Faculty of Physical Education. The main emphasis is on research leading to the dissertation.

(5) Depending on qualifications the candidate for the master's degree should anticipate one to two years for completion. The Ph.D. degree will normally require two to three years beyond the master's level.

(6) Teaching and research assistantships are available to a limited number of students.

(7) All arrangements must be made through consultation with the Dean of the Faculty of Physical Education.

## 204.52.2 / GRADUATE COURSES

P ED 501. *Research.* ♦3 (First Term, 0-6).
P ED 503. *Research.* ♦3 (Second Term, 0-6).
P ED 548. *Scientific Principles of Physical Education.* ♦6 (3-0).
P ED 552. *Administrative Problems of Physical Education and Recreation.* ♦6 (3-0).
P ED 564. *Directed Studies.* ♦6 (3-0).
P ED 567. *Seminar in Human Motor Performance.* ♦3 (Second Term. 3-0). Prerequisite: Psychology 464.
P ED 569. *Physical Growth and Development.* ♦3 (either term, 3-0).
P ED 578. *Research Methods in Health, Physical Education and Recreation.* ♦6 (3-3).
P ED 588. *Historical and Comparative Physical Education.* ♦6 (3-0).
P ED 590. *History of Sport and Games.* ♦6 (3-0).
P ED 650. *Seminar in Exercise Physiology.* ♦6 (3-0).
P ED 652. *Advanced Seminar in Exercise Physiology.* ♦6 (3-0).
P ED 660. *Seminar in History of Sports and Physical Education.* ♦6 (3-0).
P ED 662. *Seminar in Comparative Physical Education and Sport.* ♦6 (3-0).
P ED 670. *Seminar in Human Motor Development.* ♦6 (3-0).
P ED 672. *Advanced Seminar in Human Motor Performance.* ♦6 (3-0).

# 204.53 / *Physics*

## 204.53.1 / THE DEGREES OF M.SC. AND PH.D.

(1) Programs leading to the degrees of Master of Science and Doctor of Philosophy are open to suitable graduates in Physics, Engineering Physics, or equivalent courses, who meet the entrance requirements of the Faculty of Graduate Studies.

(2) The Department's principal fields of research are:

*Theoretical Physics*: Solid state, physical acoustics, nuclear physics, elementary particles, field theory.

*Nuclear Physics*: Nuclear structure and nuclear reactions. A 6 MeV Van de Graaf accelerator with a beam pulse compression system and an on-line computer permit a wide variety of experiments.

*Solid State Physics*: Superconductors, semiconductors, solid helium, NMR, acoustic attenuation, electron microscopy, transport properties in metals.

*Geophysics*: Geomagnetism, mass spectrometry, paleomagnetism, seismology.

*Other Areas*: Astronomy, laboratory astrophysics, precision optical spectroscopy, radiation and medical physics.

(3) Individual programs will be arranged in consultation with the chairman of the Department of Physics and members of the Department.

(4) A number of teaching assistantships are available for graduate students who have no other financial assistance. The stipends vary from $1,800 to $3,600 plus fees. Inquiries concerning assistantships should be addressed to the assistant chairman of the Department. In addition to the above, research supplements to the value of $1,000 are available during the summer.

## 204.53.2 / GRADUATE COURSES

PHYS 516. *Introductory Solid State Physics.* ♦4 (2-0).
PHYS 550. *Mathematical Physics.* ♦6 (2-1s).
PHYS 560. *Optics and Spectroscopy.* ♦6 (3-0).
PHYS 570. *Quantum Mechanics.* ♦6 (3-0).
PHYS 572. *Nuclear Physics.* ♦4 (2-0).
PHYS 574. *Radiation Physics.* ♦6 (3-0).
PHYS 576. *Reactor Physics.* ♦3 (Second Term, 3-0).
PHYS 601. *Seminar in Advanced Topics.* ♦2 (0-1s). Weekly seminars are held in each of the following fields: Theoretical Physics, Nuclear Physics, Solid State Physics, Geophysics, of which the student must select one series.
PHYS 611. *Semiconductors.* ♦3 (either term, 3-0).
PHYS 613. *Low Temperature Physics.* ♦3 (either term, 3-0).
PHYS 615. *Lattice Defects in Solids.* ♦3 (either term, 3-0).
PHYS 617. *Transport Properties in Metals.* ♦3 (either term, 3-0).

PHYS 621. *Geomagnetism.* ♦3 (First Term, 3-0).
PHYS 623. *Time Sequence Analysis.* ♦3 (First Term, 3-0).
PHYS 624. *Theoretical Seismology.* ♦3 (Second Term, 3-0).
PHYS 626. *Stable and Radioactive Isotope Studies.* ♦3 (First Term, 3-0).
PHYS 627. *Electromagnetic Boundary Value Problems in Geophysics.* ♦3 (First Term, 3-0).
PHYS 628. *Topics in Solar-Terrestrial Relationships.* ♦3 (Second Term, 3-0).
PHYS 629. *Paleomagnetism.* ♦3 (Second Term, 3-0).
PHYS 660. *Atomic Theory and Spectroscopy.* ♦4 (2-0).
PHYS 662. *Molecular Spectroscopy.* ♦4 (2-0).
PHYS 672. *Advanced Nuclear Physics.* ♦6 (3-0).
PHYS 674. *Experimental Topics in Nuclear Physics.* ♦6 (3-0).
PHYS 680. *Advanced Quantum Mechanics.* ♦6 (3-0).
PHYS 682. *Advanced Electromagnetic Theory.* ♦6 (3-0).
PHYS 685. *Advanced Statistical Mechanics.* ♦6 (3-0).
PHYS 686. *Critical Phenomena.* ♦3 (First Term, 3-0).
PHYS 688. *Solid State Theory.* ♦6 (3-0).
PHYS 690. *Quantum Field Theory.* ♦6 (3-0).
PHYS 691. *Elementary Particle Physics.* ♦6 (3-0).
PHYS 692. *Group Theory and Applications.* ♦6 (3-0).
PHYS 697. *Nuclear Structure.* ♦6 (3-0).
PHYS 698. *Modern Mathematical Concepts in Contemporary Physics.* ♦4 (2-0).
PHYS 699. *Selected Topics in Theoretical Physics.* ♦4 (2-0).
PHYS 788. *Advanced Topics in Solid State Theory.* ♦(3-0).

NOTE: In consultation with the Department of Physics certain graduate Mathematics courses may be selected as part of a graduate program in Physics.

## 204.54 / *Physiology*

### 204.54.1 / THE DEGREES OF M.SC. AND PH.D.

(1) Facilities are available for graduate training leading to the Master of Science and Doctor of Philosophy degrees. The Department is adequately equipped for most fields of physiological research including certain areas of biophysics.

(2) Financial assistance in the form of Teaching and Research Assistantships is usually available for graduate students.

(3) Information and requests for application forms for admission may be obtained from the Dean of the Graduate Faculty. Students may also write to the head of the Department in regard to their special interests and related matters.

### 204.54.2 / ADVANCED STUDY IN PHYSIOLOGY

(1) The Department of Physiology offers a one-year program for graduates in Medicine wishing to spend a year of advanced study in basic science. This program does not lead to a degree, but may satisfy some of the course requirements should the student later decide to proceed to a master's degree.

(2) The program includes graduate courses, participation in a weekly seminar, duties as a class laboratory demonstrator, participation in a research project, and optional attendance at undergraduate lectures.

### 204.54.3 / GRADUATE COURSES

PHYSL 502. *Problems in Current Research.* ♦2 (0-3).
PHYSL 503. *Topics in Biophysics.* ♦3 (either term, 3-0).
PHYSL 504. *Adrenal Cortex and Gonads.* ♦3 (either term, 3-0). E. O. Hohn.
PHYSL 506. *Seminar and Tutorial Course.* ♦3 (either term, 3-0).
PHYSL 507. *Temperature Regulation.* ♦3 (either term, 3-0).
PHYSL 509. *Advanced Respiratory Physiology.* ♦3 (either term, 3-0). C. Heath.
PHYSL 600. *Seminar.* ♦2 (1s-0).

## 204.55 / *Plant Science*

### 204.55.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Plant Science offers programs leading to the degrees of Master of Science and Doctor of Philosophy.

(2) The Department is equipped with laboratories, greenhouses, and growth chamber and field facilities for research in horticulture, plant pathology, plant physiology and biochemistry, weed science, and crop ecology. Specific research interests of the Department include weed control, plant growth regulators, grassland improvement, the production of horticultural crops, host-pathogen relationships and protection of plants against disease, protein biochemistry, quality of cereals and oil-seeds, plant morphogenesis, ethylene metabolism, biochemistry of ageing tissue, and alkaloid metabolism.

(3) Applicants or the M.Sc. program should hold a B.Sc. degree or its equivalent; applicants for the Ph.D. program should hold an M.Sc. degree or its equivalent. Length of programs will depend to some extent on the previous qualifications of the candidates.

(4) Course requirements in graduate programs are based on the student's previous training and anticipated needs in his field of specialization. Normally all advanced courses are acceptable as part of a graduate program. In addition, candidates must submit and defend a thesis based on research. Ph.D. candidates must demonstrate a com-

petent reading knowledge of a language other than English, but there is no language requirement for the M.Sc.

(5) Financial assistance from research grants is available for a number of qualified candidates.

(6) Inquiries should be addressed to the head of the Department.

## 204.55.2 / GRADUATE COURSES

### *Biometrics*

PL SC 455. *Statistics for Biological Research.* ♦6 (3-3).

### *Plant Science*

PL SC 500. *Seminar in Plant Science.* ♦1 (1-1). Oral reports by individual students covering the literature on selected topics. Note: Required each year of all graduate students in Plant Science.

### *Horticulture*

HORT 507. *Reading Projects in Horticulture.* Maximum ♦6 (3-0).

HORT 508. *Research Projects in Horticulture.* Maximum ♦6 (3-0).

HORT 509. *Selected Topics in Horticulture.* Maximum ♦6, depending on the project. Recent developments of special interest dicsussed at an advanced level.

### *Plant Pathology*

PL PA 510. *Plant Virology.* ♦3 (First Term, 3-3). Basic principles and methods dealing with morphology, purification, multiplication, mutation, and transmission of plant viruses. Prerequisite: Consent of instructor.

PL PA 511. *Reading Projects in Plant Pathology.* Maximum ♦6 (3-0).

PL PA 512. *Research Projects in Plant Pathology.* Maximum ♦6 (3-0).

PL PA 631. *Advanced Plant Pathology.* ♦2 (0-3).

PL PA 635. *Plant Pathogenesis.* ♦3 (First Term, 3-0). A critical review of literature related to the physiology of diseased plants, e.g., effect on growth, disintegration of tissue, wilting and changes in respiration. Prerequisite: Consent of instructor.

PL PA 636. *Plant Pathogenesis.* ♦3 (Second Term, 3-0). A continuation of Plant Pathology 635; histological, physiological, and biochemical defence mechanisms, toxins, fungicidal action. Prerequisite: Consent of instructor.

### *Plant Physiology and Biochemistry*

PL PH 513. *Reading Projects in Plant Physiology and Biochemistry.* Maximum ♦6 (3-0).

PL PH 514. *Research Projects in Plant Physiology and Biochemistry.* Maximum ♦6 (3-0).

PL PH 551. *Advanced Plant Biochemistry.* ♦3 (either term, 3-0). Selected topics in plant metabolism, with emphasis on the comparative biochemistry of respiration and carbon assimilation. Evaluation of recent research and of methods of investigation in these fields. Prerequisites: Biochemistry 300, or Plant Physiology and Biochemistry 431, 432 or consent of the Department.

PL PH 620. *Plant Morphogenesis.* ♦4 (2-2). Prerequisite: Consent of instructor.

### *Weed Science and Crop Ecology*

WD SC 501. *Reading Projects in Weed Science and Crop Ecology.* Maximum ♦6 (3-0).

WD SC 502. *Research Projects in Weed Science and Crop Ecology.* Maximum ♦6 (3-0).

# 204.56 / *Political Science*

## 204.56.1 / THE DEGREES OF M.A. AND PH.D.

(1) The Department of Political Science offers programs leading to the Master of Arts and Doctor of Philosophy degrees.

(2) The following areas of specialization are offered: international politics; political philosophy; Canadian government and politics; Western European government and politics; Soviet government and politics; political behavior.

(3) A number of graduate assistantships are available for qualified students.

(4) Students contemplating graduate work in Political Science should direct their inquiries to the head of the Department.

## 204.56.2 / GRADUATE COURSES

POL SC 500. *Conference Course.* ♦6.

POL SC 501. *Comparative Political Institutions.* ♦6.

POL SC 510. *Advanced Political Thought.* ♦6.

POL SC 515. *Quantitative Techniques of Political Analysis I: Statistics for Political Scientists.* ♦4 (First Term).

POL SC 516. *Quantitative Techniques of Political Analysis II: Computer Programming and Analysis.* ♦4 (Second Term).

POL SC 521. *Canadian Government.* ♦3 (either term).

POL SC 523. *Canadian Political Parties.* ♦3 (either term).

POL SC 541. *Seminar in Soviet Politics.* ♦6.

POL SC 545. *Problems of Communism.* ♦6.

POL SC 546. *Soviet and East European Studies.* ♦6.

POL SC 593. *Political Behavior.* ♦6.

POL SC 600. *Political Institutions.* ♦6.

POL SC 601. *Federalism.* ♦6.

POL SC 603. *Comparative Government.* ♦6.

POL SC 605. *Systematic Study of Politics.* ♦6.

POL SC 607. *Comparative Federal Systems.* ♦3 (either term).

POL SC 609. *Readings in Comparative Politics.* ♦3 (either term).

POL SC 610. *Political Theory.* ♦6.

POL SC 613. *Seminar in Soviet Political Theory.* ♦6.

POL SC 615. *Empirical Political Theory.* ♦3 (either term).

POL SC 616. *Normative Political Theory.* ♦3 (either term).

POL SC 619. *Readings in Political Philosophy.* ♦3 (either term).

POL SC 620. *Canadian National Government.* ♦3 (either term).

POL SC 623. *Canadian Federalism.* ♦3 (either term).

POL SC 629. *Readings in Canadian Government and Politics.* ♦3 (either term).

POL SC 641. *Research in Soviet Government.* ♦6.

POL SC 649. *Readings in Soviet Politics.* ♦3 (either term).

POL SC 651. *Public Administration* ♦6.

POL SC 660. *Theories of International Politics.* ♦6.

POL SC 661. *International Politics.* ♦6.

POL SC 663. *Problems of International Organization: Political and Security.* ♦6.

POL SC 667. *International Behavior.* ♦6.

POL SC 668. *Readings in International Politics.* ♦3 (either term).

POL SC 669. *Readings in International Organization and Law.* ♦3 (either term).
POL SC 675. *Systems Analysis: Asian Political Systems.* ♦6.
POL SC 679. *Readings in Asian Politics.* ♦3 (either term).
POL SC 680. *Western European Democracies.* ♦6.
POL SC 689. *Readings in Western European Government and Politics.* ♦3 (either term).
POL SC 690. *Political Behavior.* ♦6.
POL SC 695. *Political Psychology.* ♦6.
POL SC 698. *Readings in Political Psychology.* ♦3 (either term).
POL SC 699. *Readings in Political Behavior.* ♦3 (either term).

## 204.57 / *Psychology*

### 204.57.1 / THE DEGREES OF M.A., M.SC., AND PH.D.

(1) The Department of Psychology offers graduate work leading to the degrees of M.A., M.Sc., and Ph.D.

(2) Facilities for research include laboratories for human and animal experimentation, a departmental clinic, rooms for individual psychological testing, interviewing, and counselling, and practicum arrangements with local hospitals and industries.

(3) Requirements for the master's degree include:

(i) demonstration of competence in the areas of the following courses:
PSYCO 502. *History and Systems of Psychology.*
PSYCO 530. *Experimental Design.*
PSYCO 560. *Advanced Experimental Psychology.*
PSYCO 583. *Personality-Social.*

(ii) research in one of the following areas of specialization within psychology: clinical, comparative and physiological, general experimental, industrial, learning, methodology, personality, psychometrics, psychopathology, sensation and perception, social, theoretical.

(iii) for candidates in Clinical Psychology, demonstration of competence in the following courses in addition to those listed in (i) above:
PSYCO 535. *Clinical Assessment I.*
PSYCO 536. *Clinical Assessment II.*
PSYCO 537. *Clinical Method I.*
PSYCO 539. *Clinical Method II.*
PSYCO 586. *Normality, Neurosis, Sociopathy.*

(4) Requirements for the Ph.D. include:

(i) demonstration of competence in the areas of the courses listed in ¶ (3) (i), above, and in addition:
PSYCO 698. *Advanced Research Techniques I.*
PSYCO 699. *Advanced Research Techniques II.*

(ii) demonstration of competence in research in one of the following areas: (a) theoretical and experimental psychology; (b) quantitative psychology, psychometrics; (c) personal psychology, psychopathology; (d) clinical research; (e) social psychology. Intensity of depth as opposed to extent of breadth may vary somewhat in accordance with the candidate's interests. Individual programs are determined in consultation with the Department.

(5) Graduate assistantships for the Winter Session involving teaching or research or both, are available to outstanding applicants. The amounts vary from $1,800 to $3,600 plus fees and a travel grant up to $250. Initial inquiries concerning these and other graduate awards should be addressed to the Dean of the Faculty of Graduate Studies. Completed applications should be forwarded to the Chairman, Graduate Students Selection Committee, Department of Psychology. In addition to the above several summer research assistantships and bursaries to the value of $1,000 are available.

### 204.57.2 / GRADUATE COURSES

PSYCO 502. *History and Systems of Psychology* ♦6 (3-0).
PSYCO 504. *Conference Course in Psychology.* ♦3 (First Term, 3-0).
PSYCO 505. *Conference Course in Psychology.* ♦3 (Second Term, 3-0).
PSYCO 520. *Seminar in Industrial Psychology.* ♦6 (3s-0).
PSYCO 528. *Advanced Psychometric Theory.* ♦6 (3-1).
PSYCO 530. *Experimental Design.* ♦6 (3-0).
PSYCO 532. *Principles of Research.* ♦3 (First Term, 3-0).
PSYCO 533. *Theory of Data Analysis.* ♦3 (Second Term, 3-0).
PSYCO 534. *Multivariate Methods,* ♦6 (3-0).
PSYCO 535. *Clinical Assessment I.* ♦6 (3-3).
PSYCO 536. *Clinical Assessment II.* ♦6 (3-3).
PSYCO 537. *Clinical Method I.* ♦6 (4-0).
PSYCO 538. *Clinical Assessment III.* ♦6 (3-3).
PSYCO 539. *Clinical Method II.* ♦6 (3-3).
PSYCO 540. *Seminar in Social Psychology.* ♦6 (3s-0).
PSYCO 550. *Experimental Analysis of Personality.* ♦3 (either term, 3-0).
PSYCO 552. *Artificial Intelligence.* ♦6 (3-0).
PSYCO 560. *Advanced Experimental Psychology.* ♦6 (3-3).
PSYCO 565. *Seminar in Learning Theory.* ♦3 (First Term, 3-0).
PSYCO 566. *Longitudinal Behavioral Modifications.* ♦6 (3s-0).
PSYCO 570. *Drugs and Behavior.* ♦3 (either term, 3-0).
PSYCO 574. *Seminar in Philosophy and Psychology.* ♦2 (2s-0).
PSYCO 575. *Advanced Physiological Psychology.* ♦6 (3-3).
PSYCO 577. *Seminar in Physiological Psychology.* ♦3 (either term, 3s-0).
PSYCO 578. *Experimental Psychopathology.* ♦3 (either term, 3-0).
PSYCO 583. *Personality-Social.* ♦6 (3-0).
PSYCO 584. *Seminar in Personality Theory.* ♦6 (3s-0).
PSYCO 585. *Seminar in Theories of Perception.* ♦6 (3-0).
PSYCO 586. *Normality, Neurosis, Sociopathy.* ♦6 (3-0).
PSYCO 588. *The Psychoses.* ♦6 (3-0).
PSYCO 590. *Systems in Psychotherapy.* ♦6 (3-3).
PSYCO 592. *Psychological Therapies.* ♦6 (3-3).

PSYCO 599. *Honors Thesis.* ♦6 (3-3).
PSYCO 600. *Research Seminar.* ♦2 (2s-0).
PSYCO 648. *Research.* ♦3 (First Term, 3-3).
PSYCO 649. *Research.* ♦3 (Second Term, 3-3).
PSYCO 670. *Seminar in Theoretical Psychology.* ♦6 (3s-0).
PSYCO 698. *Advanced Research Techniques I.* ♦6 (3L-0).
PSYCO 699. *Advanced Research Techniques II.* ♦6 (3L-0).

## 204.58 / *Radiology*

### 204.58.1 / THE DEGREE OF M.SC.

(1) Facilities exist within the Department of Radiology, University Hospital and The University of Alberta, for students who wish to proceed to the Master of Science degree.

(2) Research may be carried out in the following fields:

(i) Radiological aspects of Nuclear Medicine.

(ii) Clinical Radiation Biology.

(iii) Radiological Physics.

(iv) Health Physics.

(v) Radiation Physics (arranged in cooperation with the Physics Department).

(3) Entrance requirements are graduation in Medicine for the clinical research areas, and in the appropriate scientific disciplines for the other research studies.

(4) Appropriate course work to be decided upon in conjunction with the head of the Department.

(5) Length of the program is one or two years.

(6) Support can be obtained from several grant-awarding agencies for work in these areas.

(7) Inquiries should be directed to the Director, Department of Radiology, University of Alberta Hospital, Edmonton.

## 204.59 / *Romance Languages and Literature*

### 204.59.1 / THE DEGREES OF M.A. AND PH.D.

(1) Graduate work leading to the degrees of M.A. and Ph.D. may be taken in the major areas of Romance Linguistics, French, Italian and Spanish.

(2) The master's degree in French or Spanish or Italian requires three courses over and above the eight courses of an Honors program in that field, for a total of eleven courses, plus the thesis (a student presenting five courses may enter as a Qualifying Graduate Student; a student presenting six or seven courses may enter a two-year M.A. program). The master's degree in Romance Linguistics is normally a two-year program unless the student has advanced standing in this area.

(3) The Ph.D. in all fields requires, besides four courses and the doctoral dissertation, competent knowledge of a second Romance Language and its literature and a reading knowledge of a language other than English or a Romance Language. Doctoral studies in Romance Linguistics require work in French, Spanish, and a third Romance Language, plus a reading knowledge of a language other than English or a Romance Language; some knowledge of Latin is strongly recommended.

(4) After an Honors degree in French, Italian, or Spanish, the master's program takes one full year; the master's program in Romance Linguistics normally takes two years. After a master's program in the field, the doctoral program takes normally two full years to the time of the candidacy examination.

(5) Graduate Teaching Assistantships, Graduate Service Assistantships, and Intersession Bursaries are available.

(6) Prospective candidates should direct their inquiries to the chairman of the Department.

### 204.59.2 / GRADUATE COURSES: FRENCH

*Composition and Language*

FREN 500. *Special Reading Course.* ♦6 (3-0).
FREN 510. *Seminar in French Composition.* ♦6 (3-0).
FREN 590. *History of Criticism in France.* ♦3 (First Term, 3-0).
FREN 595. *Methods of Criticism.* ♦3 (Second Term, 3-0).
FREN 601. *History of the French Language.* ♦6 (3-0).
FREN 602. *History of French Syntax.* ♦6 (3-0).

*Medieval Literature*

FREN 600. *Seminar in Medieval French Literature.* ♦6 (3-0).

*Renaissance Literature*

FREN 610. *Seminar in French Renaissance Literature.* ♦6 (3-0).
FREN 612. *The Spirit of Humanism in France and England at the Beginning of the Renaissance.* ♦6 (3-0).
FREN 614. *Rabelais.* ♦6 (3-0).
FREN 616. *Ronsard* ♦6 (3-0).
FREN 618. *Montaigne.* ♦6 (3-0).

*The Seventeenth Century*

FREN 619. *Seminar in Seventeenth-Century Literature.* ♦6 (3-0).
FREN 620. *The French Moralists.* ♦6 (3-0).
FREN 625. *Molière.* ♦6 (3-0).

*The Eighteenth Century*

FREN 629. *Seminar in Eighteenth-Century Literature.* ♦6 (3-0).
FREN 630. *The Eighteenth-Century Novel* ♦6 (3-0).
FREN 634. *Marivaux.* ♦6 (3-0).

FREN 636. *Voltaire.* ♦6 (3-0).
FREN 638. *Rousseau.* ♦6 (3-0).

*The Nineteenth Century*

FREN 640. *Seminar in Nineteenth-Century Literature.* ♦6 (3-0).
FREN 645. *Stendhal.* ♦6 (3-0).
FREN 648. *Literature and the Plastic Arts from the time of Delacroix and Baudelaire.* ♦6 (3-0).
FREN 651. *The Naturalistic Novel.* ♦6 (3-0).
FREN 655. *The Late Nineteenth-Century Theatre.* ♦6 (3-0).

*The Twentieth Century*

FREN 660. *Seminar in Twentieth-Century Literature.* ♦6 (3-0).
FREN 665. *Valéry.* ♦6 (3-0).
FREN 670. *Proust.* ♦6 (3-0).
FREN 699. *Conference Course.* ♦6 (3-0).

## 204.59.3 / GRADUATE COURSES: ITALIAN

ITAL 500. *Contemporary Italian Literary Aesthetics.* ♦6 (3-0).
ITAL 510. *Literary Movements of the Twentieth Century* ♦6 (3-0).
ITAL 699. *Conference Course.* ♦6 (3-0).

## 204.59.4 / GRADUATE COURSES: ROMANCE LINGUISTICS

ROM LG 500. *Phonology: Synchronic and Diachronic.* ♦6 (3-0).
ROM LG 501. *Catalan.* ♦6 (3-0).
ROM LG 505. *Comparative Romance Linguistics.* ♦6 (3-0).
ROM LG 699. *Conference Course.* ♦6 (3-0).

## 204.59.5 / GRADUATE COURSES: SPANISH

*Language*

SPAN 503. *Spanish-American Dialectology.* ♦6 (3-0).
SPAN 540. *History of the Spanish Language.* ♦6 (3-0).

*Medieval Literature*

SPAN 550. *Medieval Narrative Poetry* ♦6 (3-0).
SPAN 560. *Medieval Spanish Prose.* ♦6 (3-0).
SPAN 565. *Medieval Lyric Poetry.* ♦6 (3-0).

*The Golden Age*

SPAN 600. *The Literature of the Discovery, Conquest and Colonization of America.* ♦6 (3-0).
SPAN 610. *The Sentimental Romances and the Books of Chivalry. The Pastoral and Moresque Novel.* ♦6 (3-0).
SPAN 612. *The Picaresque Novel.* ♦6 (3-0).
SPAN 615. *Cervantes.* ♦6 (3-0).
SPAN 620. *Sixteenth Century Drama.* ♦6 (3-0).
SPAN 624. *Lope de Vega.* ♦6 (3-0).
SPAN 626. *Tirso de Molina and Juan Ruiz de Alarcon.* ♦6 (3-0).
SPAN 627. *Calderón* ♦6 (3-0).
SPAN 630. *The Romancero.* ♦6 (3-0).
SPAN 633. *The Poetry of the Baroque Period.* ♦6 (3-0).
SPAN 635. *Góngora.* ♦6 (3-0).
SPAN 640. *Quevedo and Gracián.* ♦6 (3-0).

*The Eighteenth and Nineteenth Centuries*

SPAN 650. *The Novel, Poetry and Drama of the Eighteenth Century.* ♦6 (3-0).
SPAN 660. *The Romantic Movement.* ♦6 (3-0).
SPAN 665. *Galdos and his Contemporaries.* ♦6 (3-0).

*The Twentieth Century*

SPAN 670. *Contemporary Spanish and Spanish American Poetry.* ♦6 (3-0).
SPAN 671. *Contemporary Spanish and Spanish American Novelists.* ♦6 (3-0).
SPAN 675. *Unamuno.* ♦6 (3-0).
SPAN 699. *Conference Course.* ♦6 (3-0).



# 204.60 / *Secondary Education*

## 204.60.1 / THE DEGREES OF M.ED., ED.D. AND PH.D.

(1) The Department of Secondary Education offers programs leading to the Master of Education, Doctor of Philosophy, and Doctor of Education degrees.

(2) Before a student can be admitted as a candidate for the M.Ed. or higher degree, his record must be acceptable to the Faculty of Graduate Studies and to the Department.

(3) Graduate programs in Secondary Education normally include both professional courses in education and senior or graduate courses offered by other faculties and schools in the University. Advanced Curriculum and Instruction courses in most of the traditional fields of study are offered by the Department of Secondary Education.

(4) Full-time attendance for a minimum period of one academic year at the University is required for the M.Ed. degree in Secondary Education.

(5) A number of assistantships are available to qualified candidates for the M.Ed. or Ph.D. in Secondary Education.

(6) The prospective candidate should first consult the head of the Department of Secondary Education who, together with other members of the staff, will plan an appropriate program.

## 204.60.2 / UNDERGRADUATE COURSES

The following may be taken for graduate credit:

ED CI 455. *Teaching Literature in the Secondary School.* ♦3 (First Term, 3-0).
ED CI 457. *Teaching Language and Composition in the Secondary School.* ♦3 (First Term, 3-0).
ED CI 459. *New Approaches to Foreign Language Instruction.* ♦3 (First Term, 3-0).
ED CI 461. *Advanced Curriculum and Instruction in Foreign Language Teaching.* ♦3 (First Term, 3-0).
ED CI 462. *Audiovisual Communication in Teaching and Learning.* ♦6 (3L).
ED CI 465. *Audiovisual Communications: Preparation of Instructional Materials.* ♦3 (First Term, 3-0).
ED CI 468. *Advanced Curriculum and Instruction in Secondary School Social Sciences.* ♦6 (3-0).
ED CI 471. *Modern Curriculum Problems in Secondary School Mathematics.* ♦3 (First Term, 3-0).
ED CI 473. *Instruction in Modern Secondary School Mathematics.* ♦3 (First Term, 3-0).

ED CI 475. *The Use of Computers in the Teaching and Learning of Mathematics.* ♦3 (First Term, 3-0).
ED CI 476. *Advanced Curriculum and Instruction in Secondary School Biological Sciences.* ♦6 (3L).
ED CI 480. *Advanced Curriculum and Instruction in Secondary School Physical Sciences.* ♦6 (3L).
ED CI 484. *Advanced Curriculum and Instruction in Secondary School Business Education.* ♦6 (3-0).
ED CI 488. *Advanced Curriculum and Instruction in Secondary Household Economics.* ♦6 (3-0).
ED CI 496. *Advanced Curriculum and Instruction in the Fine Arts—Music, Art or Drama.* ♦6 (6L).

### 204.60.3 / GRADUATE COURSES

ED CI 550. *Secondary Education Seminar.*
ED CI 561. *Organization and Supervision of the Audio-Visual Media Program.* ♦3 (either term, 3-0). Prerequisite: ED CI 361.
ED CI 562. *Curriculum Integration of Audiovisual Materials.* ♦6 (3-0). Prerequisite: ED CI 361.
ED CI 563. *Television in Education: Production and Use.* ♦3 (either term, 3-0). Prerequisite: ED CI 361.
ED CI 565. *Television in Education: Direction and Script Writing.* ♦3 (either term, 3-0). Prerequisite: ED CI 361.
ED CI 580. *Curriculum Development.* ♦6 (3-0).
ED CI 680. *Secondary Education.* ♦to a maximum of 6. Reading and discussion of research, curriculum, and teaching procedures in any one of the major fields of the secondary school.

## 204.61 / *Slavonic Languages and Literatures*

### 204.61.1 / THE DEGREE OF M.A.

(1) The Department of Slavonic Languages and literatures offers programs leading to the degree of Master of Arts in Russian, in Slavonic languages and literatures (Russian, Ukrainian, Polish, Serbo-Croatian, Church Slavonic), in Slavonic linguistics, and in Slavonic and Soviet Studies, with Russian language and literature serving as the core.

(2) The R. R. Gonsett Collection of the University library is of particular value for research in Slavonic studies. Supplementary facilities include a modern language laboratory and large collections of slides, records and other audio-visual aids.

(3) Information regarding assistantships and other forms of financial aid available to M.A. candidates in the Department will be supplied upon request.

(4) Address inquires to the head of the Department.

### 204.61.2 / GRADUATE COURSES

*Russian*

RUSS 500. *Special Reading Courses.* ♦6 (3-0). For graduate students who wish to prepare themselves for the M.A. or Ph.D. language requirement. Students who pass this course with a grade of at least 6 will be considered by the Department as having satisfied the reading requirement for the above degrees of The University of Alberta.
RUSS 516. *N. V. Gogol.* ♦6 (3-0).
RUSS 518. *I. S. Turgenev.* ♦6 (3-0).
RUSS 520. *L. N. Tolstoy.* ♦6 (3-0).
RUSS 522. *A. P. Chekhov.* ♦6 (3-0).
RUSS 524. *M. Gorky.* ♦6 (3-0).
RUSS 550. *The Russian Psychological Novel.* ♦6 (3-0).
RUSS 570. *Soviet Russian Literature.* ♦6 (3-0).
RUSS 610. *Russian Medieval Literature.* ♦3 (Second Term, 3-0).
RUSS 640. *Russian Poetry from A. D. Kantemir to the Present.* ♦6 (3-0).
RUSS 699. *Conference Course.* Designed to meet the needs of individual honors or graduate students. It will consist of a detailed study of some great author or a literary problem or period not dealt with in the other Honors and graduate courses.

*Ukrainian*

UKR 530. *L. Ukrainka.* ♦6 (3-0).
UKR 610. *Old Ukrainian Literature.* ♦3 (Second Term, 3-0).
UKR 616. *I. Franko.* ♦6 (3-0).
UKR 630. *Seminar on Soviet Ukrainian Novelists.* ♦6 (3s-0). Detailed treatment of several representative Soviet Ukrainian novels.
UKR 699. *Conference Course.* An Honors or graduate course designed to meet the needs of individual students. It will consist of a detailed study of some great author or a literary problem or period not dealt with in the other Honors and graduate courses.

*Slavonics*

SLAV 510. *Research Seminar.* ♦2 (1s-0). The study of bibliography and methodology.
SLAV 520. *Old Church Slavonic.* ♦6 (3-0).
SLAV 540. *Introduction to Comparative Slavonic Philology.* ♦6 (3-0).
SLAV 546. *Soviet and East European Studies.* ♦6 (3-0). An inter-disciplinary seminar.
SLAV 550. *Seminar in Slavonic Linguistics.* ♦6 (3s-0).
SLAV 600. *Early Literature of the Kievan Period.* ♦3 (First Term, 3-0).
SLAV 620. *Comparative Slavonic Literature.* ♦6 (3-0).
SLAV 650. *Departmental Seminar on Modern Slavonic Philology and Linguistics.* ♦2 (1s-0).
SLAV 670. *Research Seminar.* ♦6 (3-0). The study of research methods.
SLAV 680. *Slavonic Civilization.* ♦6 (3-0).
SLAV 699. *Conference Course.* An Honors or graduate course designed to meet the needs of individual students. It will consists of a detailed study of some Slavonic literary or linguistic problem or topic not dealt with in the other Honors or graduate courses.

## 204.62 / *Sociology*

### 204.62.1 / THE DEGREES OF M.A. AND PH.D.

(1) The Department of Sociology offers programs leading to the degrees of Master of Arts and Doctor of Philosophy.

(2) A student applying for admission to the M.A. program must be a graduate from a recognized university with at least second class or B standing (or equivalent).

(3) Requirements for the master's degree include:

(i) the completion of a minimum of eleven courses (counting courses taken in undergraduate programs) in sociology;

(ii) attainment of a satisfactory standing in a comprehensive examination in (a) methodology, (b) theory, and (c) *one* of the following special subjects: social psychology, social organization, deviance and control, demography and urban sociology, medical sociology, and community development (other fields may be chosen upon departmental approval); and

(iii) the submission and defence of an acceptable thesis.

(4) A student with an Honors degree in sociology will normally pursue a one-year program of study leading to the M.A. degree; a holder of an ordinary degree in sociology will normally pursue a two-year program of study.

(5) A student applying for admission to the Ph.D. program must hold an M.A. degree or equivalent from a recognized university, and he must show evidence of high academic standing and achievement in his initial post-graduate work.

(6) Requirements for the doctor's degree include:

(i) demonstration of high level competence in (a) methodology, (b) theory, (c) socal psychology or social organization, and (d) a fourth special subject which may include the remaining area listed under (6) (i) (c) or one of the remaining areas listed under (3) (ii) (c) (other fields may be chosen upon departmental approval);

(ii) demonstration of competent reading knowledge of French, German, or Russian; and

(iii) the submission and defence of an acceptable thesis.

(7) A student with an M.A. degree in sociology will normally pursue a two-year program of study for the Ph.D. degree.

(8) A number of part time graduate assistantships, involving teaching or research, are available. Stipends vary from $1,800 to $3,600 for the academic year of eight months, plus fees, and a travel grant allowance. Graduate students may also compete for the general graduate scholarships listed elsewhere. Initial inquiries concerning financial assistance should be addressed to the Dean of the Faculty of Graduate Studies. Completed applications should be forwarded to the head, Department of Sociology.

soc 503. *Conference Course in Sociology for Honors and Graduate Students.* ♦3 (First Term, 3-0).

soc 504. *Conference Course in Sociology for Honors and Graduate Students.* ♦3 (Second Term, 3-0).

soc 511. *Selected Topics in Sociological Analysis.* ♦3 (either term, 3s-0).

soc 518. *Research Seminar.* ♦3 (either term, 3s-0).

soc 519. *Selected Topics in Research.* ♦6 (3s-0).

soc 521. *Seminar in Theories of Deviance.* ♦3 (First Term, 3s-0).

soc 522. *Selected Topics in Deviance and Social Control.* ♦3 (3s-0).

soc 526. *Seminar in Criminological Theory.* ♦3 (either term, 3s-0).

soc 527. *Seminar in Correctional Theory.* ♦3 (either term, 3s-0).

soc 531. *Seminar in Contemporary Theories of Society.* ♦3 (either term, 3s-0).

soc 532. *Seminar in Theory Construction.* ♦3 (either term, 3s-0).

soc 537. *Seminar in the Sociology of Knowledge.* ♦3 (either term, 3s-0).

soc 541. *Seminar in Symbolic Behavior.* ♦3 (either term, 3s-0).

soc 542. *Small Group Behavior.* ♦ 3 (either term, 3s-2s).

soc 543. *Seminar in Mass Phenomena.* ♦3 (either term, 3s-0).

soc 544. *Seminar in Socialization Processes.* ♦3 (either term, 3s-0).

soc 551. *Seminar in Demography.* ♦3 (either term, 3s-0).

soc 553. *Seminar in the Human Community.* ♦3 (either term, 3s-0).

soc 561. *Seminar in Social Organization.* ♦3 (either term, 3s-0).

soc 562. *Seminar in Social Class.* ♦3 (either term, 3s-0).

soc 565. *Seminar in Work and Formal Organization.* ♦3 (either term, 3s-0).

soc 568. *Seminar in Ethnic and Minority Relations.* ♦3 (either term, 3s-0).

soc 570. *Seminar in the Family.* ♦3 (either term, 3s-0).

soc 573. *Seminar in Medical Sociology.* ♦3 (either term, 3s-0).

soc 574. *Selected Topics in Medical Sociology.* ♦3 (either term, 3s-0).

soc 580. *Seminar in Sociology of Modernization.* ♦3 (either term, 3s-0).

soc 593. *Seminar in Political Sociology.* ♦3 (either term, 3s-0).

soc 603. *Conference Course.* ♦3 (First Term, 3-0).

soc 604. *Conference Course.* ♦3 (Second Term, 3-0).

soc 611. *Seminar in Social Research Techniques and Theory.* ♦3 (either term, 3s-0).

soc 631. *Seminar in Sociological Theory.* ♦3 (either term, 3s-0).

soc 641. *Selected Topics in Social Psychology.* ♦3 (either term, 3-0).

soc 642. *Experimental Small Group Research.* ♦3 (either term, 3-0).

soc 673. *Field Research in Medical Sociology.* ♦3 (either term, 3-0).

## 204.63 / *Soil Science*

### 204.63.1 / THE DEGREES OF M.SC. AND PH.D.

(1) Students who have the necessary training may take work leading to the degree of Master of Science in the Department of Soil Science. Exceptionally well qualified graduates may be considered as candidates for the Doctor of Philosophy degree.

(2) Special fields of interest of the Department include: soil genesis and classification; interpretive classification; soil physics; soil chemistry; soil colloids; soil organic matter; soil microbiology; soil fertility; soil testing.

(3) Entrance requirement to the M.Sc. program is a B.Sc. in Agriculture from The University of Alberta or its equivalent, and to the Ph.D. program the equivalent of the M.Sc. degree. Applicants accepted who lack these qualifications may be required to register for a qualifying year or for extra courses over and above the normal program.

(4) In addition to the dissertation the following are required:

(i) For the M.Sc. degree: at least three full courses plus seminar.

(ii) For the Ph.D. degree: Soils 520, 521, 530 and 531, unless the equivalent course has been taken elsewhere, together with other courses in Soil Science or other Departments required to enable the candidate to carry out satisfactorily his research program.

(5) Minimum time to complete requirements for the M.Sc. degree is twelve months, and for the Ph.D. thirty-six months.

(6) Grants, bursaries, and assistantships are available for research from the National Research Council, the Province of Alberta, the Alberta Agricultural Research Trust, and industries interested in crop production and the use of fertilizers.

(7) Prospective students are invited to direct their inquiries about opportunities for research in specific fields and possibilities of financial assistance to the head of the Department of Soil Science.

### 204.63.2 / UNDERGRADUATE COURSES

The following may be taken for graduate credit:

SOILS 420. *Soil Classification.* ♦3 (First Term, 3-3).
SOILS 425. *Applied Soil Classification.* ♦3 (Second Term, 3-3).
SOILS 430. *Soil Microbiology.* ♦3 (First Term, 3-3).
SOILS 450. *Soil Colloids.* ♦3 (First Term, 3-3).
SOILS 460. *Soil Fertility.* ♦3 (Second Term, 3-3).
SOILS 470. *Irrigation and Drainage.* ♦3 (First Term, 3-0).
SOILS 480. *Soil Conservation.* ♦3 (Second Term, 3-0).

### 204.63.3 / GRADUATE COURSES

SOILS 501. *Special Topics and Problems.* ♦3 to 6 depending on project.
SOILS 520. *Pedology.* ♦3 (Second Term, 3-3).
SOILS 521. *Advanced Soil Chemistry.* ♦3 (First Term, 3-3).
SOILS 530. *Advanced Soil Microbiology.* ♦3 (First Term, 3-3).
SOILS 531. *Advanced Soil Physics.* ♦3 (Second Term, 3-3).
SOILS 631. *Seminar.* ♦1 (1-0).

## 204.64 / *Surgery*

### 204.64.1 / THE DEGREE OF M.SC.

(1) Research facilities are available in the Surgical Medical Research Institute for graduate students who wish to register for the degree of Master of Science in Experimental Surgery.

(2) The laboratory is well equipped for all types of experimental work on animals of all sizes. Special facilities are available for projects in the fields of experimental cardiovascular, gastrointestinal, renal and endocrine physiopathology. An adequately equipped isotope laboratory and a biochemical laboratory with technical staff are available in any of the clinical fields to assist the graduate students who wish to carry out a research project in this laboratory.

(3) Normally an M.D. will be considered an entrance requirement but consideration will be given to suitable candidates holding an appropriate Bachelor of Science degree.

(4) Requirements include preparation and defence of a thesis based on research performed by the candidate and successful completion of at least one full or two half-year graduate courses.

(5) The minimum residence requirement is a full calendar year of research.

(6) An attempt is made to support candidates by means of Research Fellowships applied for and awarded on an individual basis through the Medical Research Council of Canada. Limited funds are available in the Department of Surgery for the support of additional candidates.

(7) Inquiries should be directed to the head of the Department of Surgery, University Hospital.

### 204.64.2 / GRADUATE COURSE

SURG 500. *Experimental Surgery.* ♦3 (Second Term, 0-3).

## 204.65 / *Zoology*

### 204.65.1 / THE DEGREES OF M.SC. AND PH.D.

(1) The Department of Zoology has facilities to train students for the Master of Science and Doctor of Philosophy degrees.

(2) Particular emphasis is laid upon ecology, physiology, invertebrate zoology, parasitology and animal behavior. A reference collection of the invertebrate and vertebrate fauna of Alberta is housed in the Department. An electron microscope and histological, radio-biological and controlled aquatic environment apparatus are available, as well as general laboratory and collecting equipment. Three biological stations serve as headquarters for summer field work.

(3) Programs for graduate degrees in Zoology conform to the general regulations of the Faculty of Graduate Studies.

(4) A number of assistantships for graduate students are available. Funds are also available for the support of researches undertaken during the summer.

(5) All inquiries concerning registration and financial assistance should be directed to the head of the Department of Zoology. Registration as a graduate student in Zoology is done in consultation with members of the Department.

### 204.65.2 / UNDERGRADUATE COURSES

The following may be taken for graduate credit:

ZOOL 405. *Ichthyology.* ♦6 (First Term, 3-3).
ZOOL 406. *Ornithology.* ♦6 (Second Term, 3-3).
ZOOL 407. *Herpetology.* ♦6 (Second Term, 3-3).
ZOOL 408. *Mammalogy.* ♦6 (First Term, 3-3).
ZOOL 411. *Embryology.* ♦6 (First Term, 3-3).
ZOOL 412. *Experimental Embryology.* ♦6 (Second Term, 3-3).
ZOOL 421. *Mechanisms of Evolution.* ♦3 (Second Term, 3-0). (Not offered, 1968-69.)
ZOOL 440. *Comparative Animal Physiology.* ♦6 (3-3).
ZOOL 441. *Vertebrate Physiology.* ♦6 (First Term, 3-3). (Not offered, 1968-69.)
ZOOL 448. *Comparative Endocrinology.* ♦6 (First Term, 3-3). (Not offered, 1968-69.)
ZOOL 451. *Aquatic Invertebrates of Alberta.* ♦6 (Second Term, 3-3).
ZOO 452. *Principles of Parasitism.* ♦6 (Second Term, 3-3).
ZOOL 453. *General Protozoology.* ♦6 (First Term, 3-3).
ZOOL 455. *Protozoan Parasites.* ♦6 (Second Term, 3-3). (Not offered, 1968-69.)
ZOOL 464. *Limnology.* ♦6 (First Term, 3-3).
ZOOL 465. *Boreal Ecology.* ♦6 (Second Term, 3-3).
ZOOL 471. *Animal Behavior.* ♦4 (First Term, 3-1).
ZOOL 481. *Practical Histology.* ♦6 (Second Term, 2-4).

NOTE: See also courses listed under Biology, § 204.9.

### 204.65.3 / GRADUATE COURSES

*Zoology*

ZOOL 520. *Seminar in Zoology.* ♦2 (1s)
ZOOL 525. *Field Course in Zoology.*
ZOOL 529. *Special Problems in Zoology.* ♦3 (either term, 3-0).
ZOOL 540. *Environmental Physiology.* ♦4 (First Term, 2-5; Second Term, 2-0).
ZOOL 541. *Seminar in Environmental Physiology.* ♦2 (First Term, 2-0).
ZOOL 542. *Seminar in Comparative Animal Physiolgy.* ♦4 (2-0). (Not offered, 1968-69.)
ZOOL 543. *Advanced Comparative Animal Physiology.* ♦4 (First Term, 2-0, Second Term, 2-5). (Not offered, 1968-69.)
ZOOL 555. *Wildlife Parasitology.* ♦3 (First Term, 3-3). (Not offered, 1968-69.)
ZOOL 556. *Helminthology.* ♦2 (1-5).
ZOOL 561. *Seminar in Advanced Animal Ecology.* ♦3 (Second Term, 3-0).
ZOOL 562. *Conservation Topics.* ♦2 (1-0). (Not offered, 1968-69.)
ZOOL 563. *Population Ecology.* ♦3 (Second Term, 3-3). (Not offered, 1968-69).
ZOOL 564. *Stream Limnology.* ♦3 (Second Term, 3-0). (Not offered, 1968-69.)
ZOOL 565. *Principles of Wildlife Conservation.* ♦6 (3-3).
ZOOL 571. *Advanced Animal Behavior.* ♦3 (Second Term, 3-1).

*Paleontology*

PALEO 518. *Paleontology of the Lower Vertebrates.* ♦3 (First Term, 3-3).
PALEO 519. *Paleontology of the Higher Vertebrates.* ♦3 (Second Term, 3-3).
PALEO 620. *Problems in Vertebrate Paleontology.* ♦2 (1-0).

## 204.66 / *Chemical and Petroleum Engineering*

### 204.66.1 / GRADUATE COURES NOT LISTED IN § 204.12.2

CH E 500. *Design Project.* An engineering project course for students registered in a Master of Engineering program.
CH E 510. *Advanced Mass Transfer Operations.* ♦3 (Second Term, 3-0). F. D. Otto. Molecular diffusion; interphase mass transfer; simultaneous heat and mass transfer; liquid-liquid extraction; multi-component distillation and absorption; computer design of separation processes. Text: Smith, Design of Equilibrium Stage Processes.
CH E 516. *Rheology and Polymer Processing.* ♦3 (Second Term, 310). F. A. Seyer. Non-Newtonian fluids; non-viscometric deformations, turbulence theory for viscous and visco-elastic fluids. Prerequisite: CH E 523 or consent of instructor. Text: Frederickson, Principles and Applications of Rheology.
CH E 534. *Applied Kinetics and Catalysis.* ♦3 (First Term, 3-0). I. G. Dalla Lana. Design of homogeneous and heterogeneous reactors for isothermal and non-isothermal operation; analysis of rate data; transoprt processes in heterogeneous catalytic systems. Text: Kramers and Westerterp, Elements of Chemical Reactor Design and Operation.
CH E 536. *Chemical Kinetics and Catalysis.* ♦3 (Second Term, 3-0). Gas phase reactions; kinetics in liquid solutions; characterization of catalysts; heterogeneous catalysis.

CH E 542. *Dynamics of Process Systems.* ♦3 (First Term, 3-3/8). R. K. Wood. Analysis and simulation of the dynamics of chemical engineering system; on-line data acquisition and control. Prerequisite: CH E 442 or equivalent.

CH E 544. *Advanced Process Control.* ♦3 (Second Term, 3-3/2). D. G. Fisher. Analysis of nonlinear and sampled data control systems; introduction to computer control and optimization.

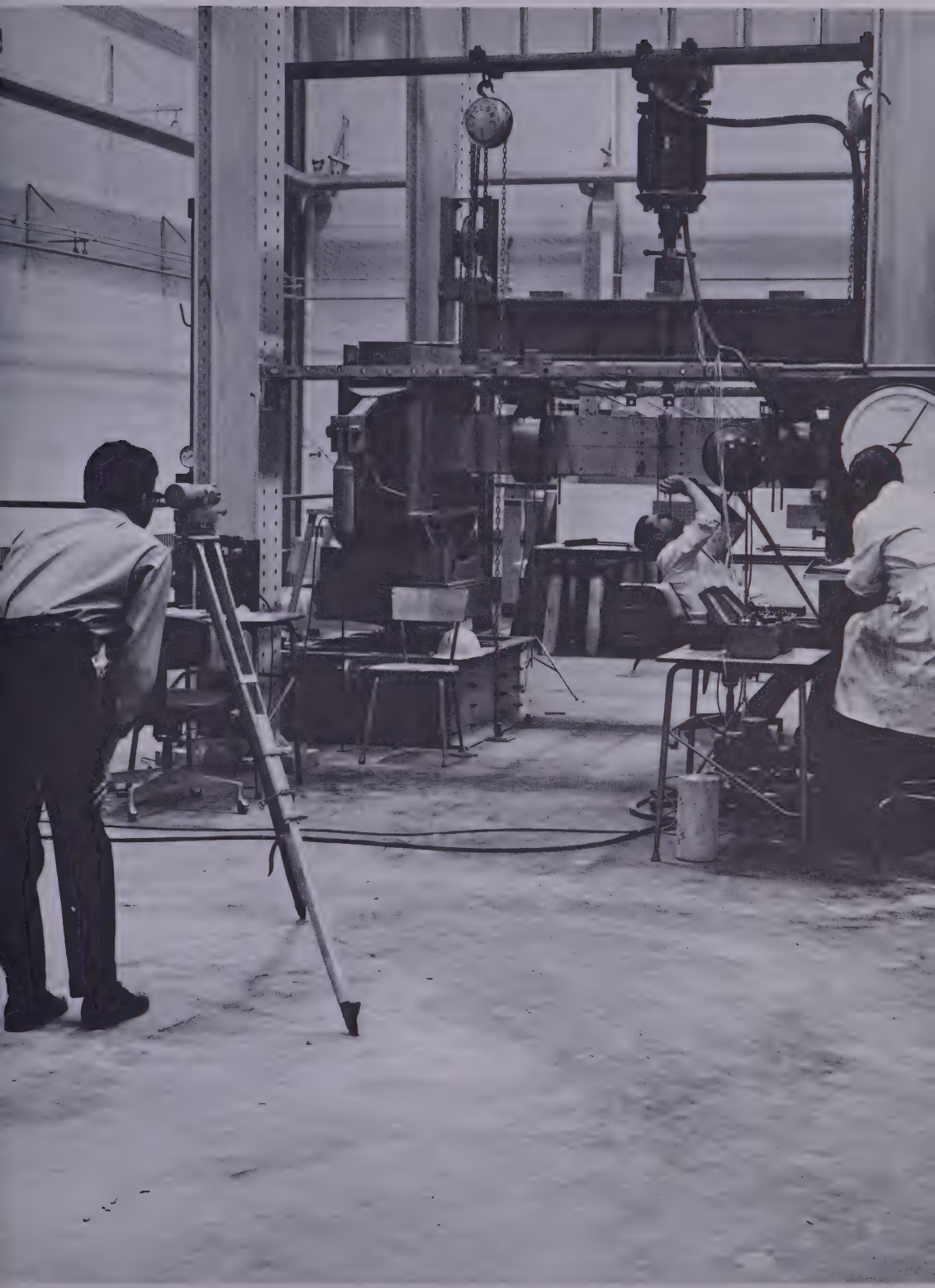
CH E 576. *Applied Mathematics I.* ♦3 (First Term, 3-0). W. Nader. Application of mathematics to engineering problems with emphasis on tensor analysis. Text: Sokolnikoff, Tensor Analysis.

CH E 578. *Applied Mathematics II.* ♦3 (Second Term, 3-0). W. Nader. Application of mathematics to engineering problems with emphasis on integral operation methods.

PET E 544. *Fluid Mechanics of Natral Gas Production* ♦3 (First Term, 3-0) P. M. Dranchuk. Single and multiphase flow in circular conduits; steady and transient single phase flow in porous media.

PET E 582. *Graduate Seminar.* ♦1 (0-1s). Discussion of progress and problems in research underway in the Department.

PET E 594. *Advanced Topics in Petroleum Engineering.* ♦3 (Second Term, 3-0). An advanced treament of selected petroleum engineering topics of current interest to staff and students.



*R. B. Wishart, Administrator of Student Awards.*

# Awards

## 221 / INTRODUCTORY

### 221.1 / *Awards Office Staff*

*Administrator of Student Awards*
R. B. WISHART, B.Com.

### 221.2 / *General Information*

This Calendar includes a complete list of awards of all kinds and of financial assistance available to students at The University of Alberta, Edmonton, as shown in the Table of Contents.

Students of high ability or those who require financial assistance are urged to read carefully the sections of interest to them.

Application forms may be had from the Student Awards Office, Edmonton. Completed applications must be received by the Student Awards Office, Edmonton, by the dates indicated in the various sections.

The University assumes liability for the payment of fellowships, scholarships, bursaries, prizes and other awards only to the extent that gifts from donors, or returns from particular investments for these purposes, will permit.

For information regarding assistance under the Provincial Students Assistance Act or the Canada Student Loans Plan refer to the special sections in this calendar or inquire of Student Awards Office.

As this calendar is published a considerable time before the opening of the Session, the University reserves the right to make whatever changes circumstances may require, including cancellation of particular awards.

## 222 / MATRICULATION AWARDS

### 222.1 / *General Information*

Unless otherwise stated in the terms of any award, these awards are tenable only at The University of Alberta, Edmonton. There are a few which are also tenable at a Junior College affiliated with the University. If so, this is stated in the terms.

In order that awards may be equitably distributed, no student may hold more than one major award in any one year. All monetary awards except certain cash prizes are contingent upon the student proceeding with his university program in the immediate next academic session and are payable only when the student is in actual attendance at the University. Payment of fees is a first charge against such awards.

Application should be made as indicated in the terms of the various awards. Awards will be announced about August 31.

### 222.2 / *List of Awards*

*The Alberta Hotel Association Scholarships*

*Value*: $250 or $500.
*Number*: 68.
*Conditions*: Awarded on a basis of academic standing and financial need. Amounts of $250 are intended for students who can secure the desired program in their home city and those of $500 for students who must live away from home.
*Where tenable*: At any university in Alberta or at any junior college affiliated with such a university or at another university if the program is not available in Alberta.
*Apply*: Application forms may be secured from the Alberta Hotel Association, Credit Foncier Building, 10275 Jasper Avenue, Edmonton, and must be completed and returned by July 15.

*The Alberta Institute of Agrologists Scholarship*

*Field of Study*: Agriculture.
*Value*: $250.
*Conditions*: Awarded annually to an applicant from either an Alberta high school or

an agricultural and vocational college on the basis of scholastic standing, which must be at least 70%.
*Where tenable*: At any university or affiliated junior college in the Province of Alberta where the program is offered.
*Apply*: Application forms are available from any member of the Alberta Institute of Agrologists or from the Registrar, Alberta Institute of Agrologists, The University of Alberta, Edmonton, and must be mailed to reach the Registrar, Alberta Institute of Agrologists, by July 25.

*The Alberta Wheat Pool Bursaries for Rural Students*

*Value*: $500 per year for up to five undergraduate years.
*Number*: Two, one for students living north of township 44 and one for those living south of, and including township 44.
*Conditions*: Offered to matriculants from Alberta high schools whose parents are actively engaged in farming. Basis of award will be matriculation standing and financial need. Preference will be given to applicants entering the Faculty of Agriculture. An average of 5.5 is required for renewal.
*Where tenable*: At any university in Alberta or affiliated junior college.
*Apply*: Administrator of Student Awards by August 1.

*The Alberta Wheat Pool Scholarships*

*Field of Study*: Household Economics.
*Value*: $200 each.
*Number*: 3.
*Conditions*: One award entering each of first, second and third years of Household Economics. Applicants must have been members of 4-H Homemaking Clubs.
*Apply*: Supervisor of 4-H Clubs, Provincial Department of Youth, Edmonton, by August 1.

*The Association of Professional Engineers of Alberta Matriculation Awards*

*Field of Study*: Engineering, Geology or Geophysics.
*Value*: Tuition and fees for first year.
*Number*: Variable.
*Conditions*: Awards will be made on the basis of standings in Mathematics 30, Mathematics 31, Chemistry 30 and Physics 30 or 32.
*Where tenable*: Any university in Alberta.
*Apply*: Selection will be made by the Association. Application not necessary.

*The Viscount Bennett Scholarships*

*Value*: $350 each.
*Number*: 3.
*Conditions*: Open to students who resided for at least five consecutive years in Calgary or within twenty miles of that city, or in Banff National Park. Awarded on the basis of academic attainment, good character and satisfactory personal qualities.
*Donor*: From a trust created by the late Right Honorable Viscount Bennett, P.C., K.C., LL.D., D.C.L., of Calgary and Mickelham.
*Apply*: Administrator of Student Awards by August 1.

*The Beta Sigma Phi Matriculation Bursary*

*Value*: $500.
*Conditions*: The award will be based on high academic standing in the required Grade XII subjects and evidence of financial need. The student's home must be in that part of Alberta north of Red Deer.
*Apply*: Administrator of Student Awards by August 1.

*The Calgary and District Retail Druggists' Association Scholarship*

*Field of study*: Pharmacy.
*Value*: $250.
*Conditions*: Award will be based on the standing in the required subjects of Grade XII. The student must have attended Grade XII in that part of Alberta south of a line from Rocky Mountain House to Red Deer to Coronation but not including these centres.
*Apply*: Administrator of Student Awards by August 1.

*The Canadian Bechtel Limited Bursary*

*Field of study*: Engineering.
*Value*: $600.
*Conditions*: Awarded annually on the basis of matriculation standing and financial need to a matriculant from an Alberta high school.
*Apply*: Administrator of Student Awards by August 1.

*Canadian Fina Oil Scholarships*

*Value*: $450 - $1,000.
*Number*: Variable.
*Conditions*: Offered to company employees and children or wards of such to enter any undergraduate program at any recognized university. Awards are renewable to a maximum of four years, providing satisfactory standing is maintained. The donor will, in addition, provide a grant-in-aid of $250 to the University for each scholarship holder.
*Apply*: Canadian Fina Oil Scholarship Committee, 736 - 8 Avenue, S.W., Calgary, by July 1.

*The Canadian Foundation for Poliomyelitis and Rehabilitation (Alberta Chapter) Bursaries*

*Field of study*: Rehabilitation Medicine.
*Value*: $350 each.
*Number*: 3.
*Conditions*: Awarded annually to applicants entering the first, second and third year of Rehabilitation Medicine. The basis of the award will be academic standing and financial need.

It is expected that recipients will carry on

their profession in Alberta for a reasonable period after graduation.
*Donor*: The Royal Canadian Legion.
*Apply*: Administrator of Student Awards—undergraduates by June 15 or matriculants by August 1.

*The Canadian Mathematical Congress Scholarships*

*Value*: $500 and $350.
*Number*: 2.
*Conditions*: These scholarships will be awarded to students who have taken all of their Grade XII work at an Alberta high school, have obtained satisfactory standing in this work (including Mathematics 30 and 31), and are entering the first year of a degree program at a University. The awards will be made primarily on the basis of a special examination in mathematics to be set and marked by the Department of Mathematics and to be written early in May.
*Where tenable*: Any Canadian University.
*Apply*: Candidates should apply direct to their High School Principal by March 15. Principals will forward names to the Department of Mathematics, The University of Alberta, Edmonton, by March 31.

*The City of Calgary Matriculation Scholarships*

*Value*: $500 each.
*Number*: 7.
*Conditions*: Awarded to matriculants from Calgary high schools on a basis of academic standing and financial need.
*Where tenable*: Any approved university.
*Apply*: Written application setting forth the financial ability of the home and other pertinent information should be received by the City Clerk, Calgary, by August 1 on the forms available at the Office of the City Commissioner, Calgary.

*The City of Edmonton Matriculation Scholarships*

*Value*: $300 each.
*Number*: 2.
*Conditions*: Awarded annually to matriculating students entering first year at The University of Alberta. One of the awards will be restricted to a student who has attended an Edmonton High School from grade X to XII. The award will be based on academic standing and financial need.
*Apply*: Administrator of Student Awards by August 1.

*The Civil Service of Alberta Bursaries*

*Value*: $600 or $300.
*Number*: Variable.
*Conditions*: Awarded annually to matriculants from Alberta high schools. These students must be the children of active, retired or deceased provincial servants. Amounts of $600 will be paid to recipients who find it necessary to live away from home, while $300 will be paid to recipients living at home.
*Where tenable*: Any university in Alberta, or a junior college affiliated with these; or the Institutes of Technology, Edmonton or Calgary.
*Apply*: Application forms may be obtained from the Executive Secretary, Civil Service Association of Alberta, 10008 - 106 Street, Edmonton, and should be completed and returned to him not later than July 15.

*The Percy Clubine Memorial Scholarships*

*Field of study*: Agriculture.
*Value*: $500 for three years, each.
*Number*: 2.
*Conditions*: Awarded annually to students entering first year Agriculture. The awards are conditional on a minimum Grade XII average of 70%, and are renewable for two further years subject to satisfactory academic progress.
*Donor*: Endowed by the late Hazel L. Clubine (through The Guaranty Trust Company of Canada).
*Apply*: Administrator of Student Awards by August 1.

*Cominco Diamond Jubilee Higher Education Awards*

*Value*: Two four-year awards of $1400 payable at $350 per annum, four one-year awards of $300.
*Conditions*: Open only to children of employees of the Company.
*Where tenable*: Any approved institution of higher education.
*Apply*: Secretary, Higher Education Awards Committee, Cominco Ltd., Trail, B.C.

*The Crown Zellerbach Canada Limited Matriculation Scholarship*

*Field of study*: Education.
*Value*: $1,500 ($400 payable in each of the first and second years and $350 in each of the third and fourth years).
*Conditions*: Offered annually to a student of outstanding merit based on Grade XII academic standing. In order to continue to be eligible, the student must take the four years consecutively and achieve an average of at least 5.5 each year.
*Apply*: Administrator of Student Awards by August 1.

*Edmonton Civic Employees Bursaries*

*Value*: $450 each.
*Number*: Variable.
*Conditions*: Open to children of Edmonton civic employees, active, deceased or retired on a basis of Grade XII standing and financial need.
*Where tenable*: The University of Alberta or any other institution including the Institutes of Technology, Edmonton or Calgary.
*Apply*: Application forms may be obtained from The Executive Secretary, Edmonton

Civic Employees' Welfare Chest Fund, Finance Department, City Hall, Edmonton and should be completed and returned to him by July 31.

*The Edmonton Society of Pharmacists Scholarship*

*Field of study*: Pharmacy.
*Value*: $100.
*Conditions*: Awarded annually to a student of outstanding merit on the required Grade XII subjects. The student must have carried out the work of Grade XII in that part of Alberta north of a line from Rocky Mountain House to Red Deer to Coronation and including those centres.
*Apply*: Administrator of Student Awards by August 1.

*The Federated Pipe Lines Ltd. Scholarship*

*Value*: $500 per year for up to four undergraduate years.
*Conditions*: Offered each even-numbered year to a student of outstanding merit entering first year. This scholarship is subject to renewal for three further years or until graduation, whichever is less, providing a satisfactory academic standing is maintained.
*Apply*: Administrator of Student Awards by August 1.

*The Federated Co-operatives Ltd. Matriculation Bursary*

*Value*: $375.
*Conditions*: Offered annually to a matriculating student and based on Grade XII standing and financial need.
*Apply*: Administrator of Student Awards by August 1.

*The Friends of the University Matriculation Bursaries*

*Value*: $500 each.
*Number*: 3.
*Conditions*: Offered to students of Alberta high schools, other than those of the City of Edmonton, the City of Calgary or within twenty miles of that city or in Banff National Park, on a basis of matriculation standing and financial need.
*Apply*: Administrator of Student Awards by August 1.

*General Motors Scholarship*

*Value*: $1,000 per year up to four undergraduate years. A grant-in-aid of $500 for each scholarship will be paid to the University.
*Conditions*: Offered to an outstanding student who is entering The University of Alberta. Applicants must be Canadian citizens. The basis of award will be high scholastic standing and personal qualities. A General Motors Scholar may not hold any other major award. A grade-point average of 7.0 must be maintained for renewal.
*Apply*: Administrator of Student Awards by August 1.

*The C. O. Hicks Matriculation Scholarship*

*Value*: $200.
*Conditions*: Offered to a matriculating student who has attended Victoria Composite High School for at least two years including the graduating year. The basis of the award will be academic merit and qualities of good citizenship. The award will be paid $100 entering first year and $100 entering second year dependent on satisfactory completion of first year.
*Donor*: Endowed by alumni, teachers and former teachers of Victoria Composite High School.
*Apply*: By September 1, with proof of academic standing and admission to The University of Alberta, to Principal, Victoria Composite High School.

*The Hudson's Bay Oil and Gas Company Limited Bursary*

*Field of study*: Engineering
*Value*: $400 per year for four years plus a grant-in-aid of $100 per year to the University.
*Conditions*: Awarded on the basis of scholastic achievement, personal qualities and character with due consideration to financial need. The applicant must state an intent to study engineering related to the petroleum industry. (The first award was made in 1964 and succeeding awards will be made every four years.)
*Apply*: Administrator of Student Awards by August 1.

*The Imperial Order Daughters of the Empire Matriculation Bursaries (Coronation Bursaries)*

*Value*: $750 payable in three yearly installments of $350 the first year and $200 for each of the second and third years.
*Number*: 4.
*Conditions*: Two of the bursaries are reserved for children of men or women who served overseas with the British forces during the Great Wars. All candidates must have resided in the province of Alberta for at least three years prior to application.
*Where tenable*: Any university in Alberta or affiliated junior college.
*Apply*: The provincial educational secretary of the I.O.D.E. will notify the high schools in February of each year of the impending award. For further information and application blanks contact Mrs. D. F. Rutherford, 5452 - 111A Street, Edmonton, before June 1.

*The Inco Scholarship*

*Field of study*: Engineering, Mathematics, Chemistry, Physics, Geology or Geophysics.
*Value*: $300 plus fees for up to four undergraduate years. In addition, the donor provides a grant to the University of up to

$500, the total not to exceed $1,200 per year.
*Conditions*: Offered annually to a matriculant of outstanding merit. The award is renewable to a maximum of four years providing the holder maintains satisfactory academic standing.
*Donor*: The International Nickel Company of Canada Ltd.
*Apply*: Administrator of Student Awards by August 1.

### *The Masonic Bursaries*

*Value*: Up to $500 each.
*Number*: Variable.
*Conditions*: Open to students from Alberta high schools on a basis of academic standing and financial need. They may be renewed subject to satisfactory standing and continued financial need.
*Where tenable*: Any university in Alberta or affiliated junior college or any other university if the program is not available in Alberta.
*Apply*: Apply to the Grand Secretary, Grand Lodge of Alberta, AF and AM, 330-12 Avenue S.W., Calgary. Application forms must be completed and returned by April 30.

### *The Melton Real Estate Limited Scholarship*

*Field of study*: Business Administration and Commerce.
*Value*: $350.
*Conditions*: Awarded on a basis of high scholastic standing from an Alberta high school.
*Apply*: Administrator of Student Awards by August 1.

### *The Dr. A. J. Pauly Deferred Scholarships in Medicine*

*Value*: $600 each.
*Number*: Several.
*Conditions*: Awarded annually to outstanding matriculants who state an intention to proceed into the Faculty of Medicine at The University of Alberta. Awards will be based on Alberta Grade XII standing or its equivalent but the scholarships will be paid only on admission to second year of the Faculty following completion of the first year with a grade point average of not less than 6.5.
*Donor*: Endowed by the late Dr. Pauly (through the National Trust Co., Montreal).
*Apply*: Administrator of Student Awards by August 1.

### *The Peace River Pioneer Memorial Bursaries*

*Value*: Variable.
*Number*: Variable.
*Conditions*: Awarded to High School graduates whose homes lie north of Township 68 and west of the 5th meridian in the Province of Alberta and who are proceeding into first year of The University of Alberta or at any institution of university level affiliated with this University and located in the above area. Awards will be based on high academic standing and financial need.
*Donor*: Endowed by Mr. Charles Plavin, North Star, Alberta.
*Apply*: Administrator of Student Awards by August 1.

### *Province of Alberta Matriculation (Queen Elizabeth) Scholarships*

*Value*: $100 each.
*Conditions*: Available to bona fide residents of Alberta who have achieved 80% or better on the required subjects of matriculation from an Alberta High School.
*Where tenable*: In the first year at a university in Alberta or in a program of university level at a junior college affiliated with such a university, or at another approved college or university.
*Donor*: The Province of Alberta.
*Apply*: Apply on the Provincial Government form to Secretary, Students Assistance Board, Provincial Department of Education, Edmonton.

### *The Royal Canadian Legion Scholarships*

*Value*: $400.
*Conditions*: Awarded on the basis of scholastic ability and financial need, and according to the following priorities: (1) to a son or a daughter of a member of the armed forces or merchant navy who lost his or her life during, or as a direct result of, hostilities in the War 1939-45; or (2) to the son or daughter of a member of the said forces or merchant marine who was seriously incapacitated either physically or mentally or (3) to the son or daughter of any man or woman who served in any of His Majesty's or Allied forces during 1939-45. Failing the receipt of applications from the above-mentioned groups, consideration will be given to applicants from (4) sons or daughters of native or naturalized Canadians domiciled in Alberta.
*Donor*: Dominion Command of the Royal Canadian Legion B.E.S.L.
*Apply*: Administrator of Student Awards by August 1.

### *Service Rig Division, C.A.O.D.C. Bursaries*

*Field of study*: Engineering, Business Administration and Commerce or Geology.
*Value*: $500 each.
*Number*: 2.
*Conditions*: Offered on the basis of Grade XII academic standing and financial need.
*Donor*: Service Rig Division of the Canadian Association of Oilwell Drilling Contractors.
*Apply*: Administrator of Student Awards by August 1.

*The Robert David Sinclair Scholarship*

*Field of study*: Agriculture.
*Value*: $200.
*Conditions*: Open to students from high schools or schools of agriculture in Alberta.
*Donor*: The family of the late Robert David Sinclair, former Dean of Agriculture.
*Apply*: Administrator of Student Awards by August 1.

*The Society of Exploration Geophysicists Scholarships*

*Field of study*: Geophysics.
*Value*: $500 each.
*Number*: 4 in Canada-wide competition.
*Conditions*: Open to Canadian students majoring in Geophysics. These awards will be based on academic standing and financial need, and are open to matriculants, undergraduates or graduate students.
*Where tenable*: Any university in Canada.
*Apply*: Application forms may be secured from Canadian Society of Exploration Geophysicists Scholarship Sub-committee, P.O. Box 117, Calgary, Alberta, and should be returned completed to the same address by March 15.

*The Steel Company of Canada Bursary*

*Value*: $500 per year for up to four undergraduate years plus a grant of $500 to the University for each bursary.
*Conditions*: Awarded annually on a basis of academic standing and financial need. Applicants must be permanent Canadian residents and must have completed the final year of High School in one year.
*Apply*: Administrator of Student Awards by August 1.

*The Steel Company of Canada Scholarship in Education*

*Field of study*: Education.
*Value*: $600 per year for four years.
*Conditions*: Open to applicants whose homes are within the city limits of Edmonton and who will be entering the four year Bachelor of Education program with an intention to follow the secondary route. The award will be based on Grade XII results which must not be less than 65% in each required subject and 75% in average. Other factors such as extra-curricular activities or financial need may be taken into consideration.
*Apply*: For further information inquire of the High School principal or counsellor.

*The Robert Tegler Matriculation Scholarships*

*Value*: Tuition and fees for three years.
*Number*: 3.
*Conditions*: Awarded annually to three students of outstanding merit (not less than 80% on the required Grade XII subjects). Applicants must be Canadian citizens or British subjects, must have completed Grades X to XII in not more than four years in the Province of Alberta and at least Grade XII in an Edmonton high school. Second class standing average of 5.5 must be achieved for renewal.
*Donor*: The Tegler Foundation.
*Apply*: Administrator of Student Awards by August 1.

*The Robert Tegler Special Scholarships*

*Value*: Tuition and fees plus $300.
*Number*: 3.
*Conditions*: Available to physically handicapped students. While due weight will be given to the academic record of candidates, special consideration will be given to their background, financial need, nature of handicap, personal qualities, and other relevant points. The scholarship may be awarded to the same student a second time, or even throughout the whole undergraduate course.
*Donor*: The Robert Tegler Foundation.
*Apply*: Administrator of Student Awards by August 1.

*Trans Mountain Oil Pipe Line Company Scholarships*

*Field of study*: Engineering or the Physical Sciences.
*Value*: $300 plus a grant-in-aid to the University.
*Number*: 4.
*Conditions*: Offered to students whose homes are along the route of the Trans Mountain Pipe Line in Alberta from Edmonton west to the provincial boundary. Preference will be given to students from outside the city of Edmonton.
*Apply*: Administrator of Student Awards by August 1.

*The University of Alberta Honor Prizes*

*Value*: $50 each.
*Number*: Variable.
*Conditions*: Awarded to each matriculant from Alberta high schools entering a degree or diploma program at the University with an average standing in the required subjects of matriculation of at least 85%.
*Donor*: The Escheated Estates Fund of The University of Alberta.
*Apply*: Application not required.

*The University of Alberta Matriculation Scholarships*

*Value*: Tuition and fees for 3 years.
*Number*: Variable (at least 4).
*Conditions*: Two awards will be open annually to Alberta high school matriculants of outstanding merit (at least 80%) other than those eligible for a Tegler or Bennett matriculation scholarship. Two or more awards will be open to students of outstanding merit from either within or without the Province. Second class standing (grade point average 5.5) is required for continuation.

*Donor*: The Escheated Estates Fund of The University of Alberta.
*Apply*: Administrator of Student Awards by August 1.

### *The University of Alberta War Memorial Scholarships*

*Value*: Up to $650.
*Number*: Variable.
*Conditions*: Awarded on the basis of scholastic ability and financial need and according to the following priorities: (1) to a son or daughter of a member of the armed forces or merchant navy who lost his or her life during, or as a direct result of, hostilities in the War of 1939-45; or (2) to the son or daughter of a member of the said forces or merchant marine who was seriously incapacitated either physically or mentally; or (3) to the son or daughter of any man or woman who served in any of His Majesty's or Allied forces during 1939-45. Failing the receipt of applications from the above-mentioned groups, consideration will be given to applications from (4) sons or daughters of native or naturalized Canadians domiciled in Alberta. These awards are open to matriculants or undergraduates.
*Apply*: Matriculants apply to Administrator of Student Awards by August 1. Undergraduates apply to Administrator of Student Awards by June 15.

### *The University Women's Club of Edmonton Scholarship*

*Value*: $600, payable $400 entering first year and $200 entering second year.
*Conditions*: Awarded annually to a woman student of outstanding merit entering the first year of a degree program at The University of Alberta. It may be held concurrently with any other award or awards and will be given to the woman student with the highest average standing (at least 85%) in the June Matriculation examinations Grade XII in Alberta, who by accepting it will not forfeit any other award (or portion thereof) of an equal or greater value than this scholarship. To be eligible for the second payment, a grade point average of at least 6.5 must be achieved on the fourth year.
*Donor*: Endowed by the University Women's Club of Edmonton.
*Apply*: Administrator of Student Awards by August 1.

### *The Women's Committee of the Edmonton Symphony Society Matriculation Scholarship*

*Field of study*: Music.
*Value*: $250.
*Conditions*: Offered to a student entering the Bachelor of Music program with intent to major in orchestral instruments. Award will be based on academic standing and musical merit.
*Apply*: Selection will be made by the Department of Music.

### *The Hon. W. C. Woodward Scholarship*

*Value*: $500 per year for up to five undergraduate years.
*Conditions*: Offered annually in competition to sons, daughters and legal dependents of full-time employees, of retired employees, and of employees who died while in the service of a Woodward Store. The basis of the award will be scholastic standing in the required subjects of Grade XII in Alberta. Activity and interest in youth organizations, and outstanding qualities of citizenship, leadership and service will also be considered.
*Where tenable*: The University of Alberta or The University of Calgary.
*Apply*: Application forms are available from the Personnel Department of any Woodward Department Store and should be completed and returned to the same Department by July 15.

# 223 / UNDERGRADUATE AWARDS

## 223.1 / *General Information*

Application forms for bursaries or for scholarships which require application, may be had from the Administrator of Student Awards. For undergraduates the due date in most cases is June 15. Where no application information is shown, the award is made automatically without application.

Normally, unless otherwise stated, these awards are based on work done only at this University, and generally are tenable only at this University. In order that awards be equitably distributed, no student may hold more than one major scholarship award in a given year.

Awards will be announced as they are made from May through to September.

Unless otherwise stated, monetary awards, except certain cash prizes, are contingent upon the student's proceeding with his university program in the immediate next academic session, and are payable only when the student is in actual attendance at the University. The payment of fees is a first charge against such awards.

The University assumes liability for the payment of scholarships, bursaries, prizes and other awards only to the extent that gifts from donors or returns from particular investments for these purposes will permit.

For matriculation awards refer to the Matriculation section of the Awards Calendar.

For awards in graduate study refer to the Graduate Studies section of the Awards Calendar.

## 223.2 / *Awards open to all Faculties*

### 223.2.1 / INTRODUCTORY NOTE

The following scholarships, bursaries and prizes are available to students in any faculty of the University for whom the terms are appropriate.

### 223.2.2 / ACADEMIC AWARDS

*University of Alberta*
*Undergraduate Scholarships*

*Value*: $500 each.
*Number*: Variable (not exceeding 5).
*Conditions*: Open to students of outstanding merit in any Faculty or School and in any year, provided the student is returning in the immediate next academic session in a full-time undergraduate program.
Donor: The Escheated Estates Fund of The University of Alberta.
*Apply*: Administrator of Student Awards by June 15.

*The University of Alberta*
*Scholarships for Junior Colleges*

*Value*: Tuition and fees for one year.
*Number*: Variable.
*Conditions*: One award is offered to the student with the best academic standing from each of the Junior Colleges affiliated to The University of Alberta, provided that such standing is satisfactory to the Scholarship Committee of the University and that the student will be registered in a full-time undergraduate program at the University in the immediate next academic session.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*The University of Alberta*
*War Memorial Scholarships*

*Value*: Up to $650.
*Number*: Variable.
*Conditions*: Awarded on the basis of scholastic ability and financial need and according to the following priorities: (1) to a son or daughter of a member of the armed forces or merchant navy who lost his or her life during, or as a direct result of, hostilities in the War of 1939-45; or (2) to the son or daughter of a member of the said forces or merchant marine who was seriously incapacitated either physically or mentally; or (3) to the son or daughter of any man or woman who served in any of His Majesty's or Allied forces during 1939-45. Failing the receipt of applications from the above-mentioned groups, consideration will be given to applications from (4) sons or daughters of native or naturalized Canadians domiciled in Alberta. These awards are open to matriculants or undergraduates.
*Apply*: Matriculants apply to Administrator of Student Awards by August 1. Undergraduates apply to Administrator of Student Awards by June 15.

*Province of Alberta Undergraduate*
*(Queen Elizabeth) Scholarships*

*Value*: $100 each.
*Conditions*: Available to undergraduate students who are bona fide residents of Alberta, on a basis of academic achievement in the previous year at a university in Alberta or at a junior college affiliated with such a university provided that this shall be 80% (grade-point average 7.5) or better.
*Where tenable*: At the above institutions only.
*Donor*: The Province of Alberta.
*Apply*: Students attending The University of Alberta should apply to Administrator of Student Awards. Application must be made on the Provincial Government form.

*The Robert Tegler Special Scholarships*

*Value*: Tuition and fees plus $300.
*Number*: 3.
*Conditions*: Available to physically handicapped students. While due weight will be given to the academic record of candidates, special consideration will be given to their background, financial need, nature of handicap, personal qualities, and other relevant points. The scholarship may be awarded to the same student a second time, or even throughout the whole undergraduate program.
*Donor*: The Robert Tegler Foundation.
*Apply*: Administrator of Student Awards by August. 1.

*The City of Calgary Undergraduate Scholarships*

*Value*: $500 each.
*Number*: 2.
*Conditions*: Offered annually to Calgary students entering second year at any approved university. Awarded on academic standing and financial need.
*Apply*: Written application setting forth the financial ability of the home and other pertinent information should be received by the City Clerk, Calgary, by June 10 on forms available at the office of the City Commissioner, Calgary.

*The City of Edmonton Undergraduate Scholarships*

*Value*: $300 each.
*Number*: 4.
*Conditions*: Offered annually to undergraduate students at The University of Alberta. Two of these are restricted to students who have attended Edmonton schools from Grade X to XII.
The basis of the award will be academic standing and financial need.
*Apply*: Administrator of Student Awards by June 15.

*The IBM-Thomas J. Watson Memorial Bursaries*

*Value*: Total annual value of $1,000.
*Number*: Variable.
*Conditions*: Awarded to undergraduates who are in need and have a high academic standing. The donor will also provide a grant-in-aid of $500 to the University.
*Donor*: International Business Machines Company Limited.
*Apply*: Administrator of Student Awards by June 15.

*Interprovincial Pipe Line Company Bursaries*

*Value*: Total annual value of $2,500.
*Number*: Variable.
*Conditions*: Provided for undergraduates having financial need and high academic standing.
*Apply*: Administrator of Student Awards by June 15.

*The Samuel J. McCoppen Bursaries*

*Value*: Total of $1,800 annually.
*Number*: Variable.
*Conditions*: Awarded to undergraduates who are in need and have a high academic standing.
*Donor*: The Will of the late Samuel J. McCoppen.
*Apply*: Administrator of Student Awards by June 15.

*The Procter and Gamble Company Bursaries*

*Value*: Total annual value of $1,500.
*Number*: Variable.
*Conditions*: Awarded to undergraduates who are in need and have a high academic standing. The Company also provides an annual grant of $600 to the University.
*Apply*: Administrator of Student Awards by June 15.

*The J. M. MacEachran Essay Prizes*

*Number* 3.
*Conditions*: Offered annually by the Philosophical Society of The University of Alberta. The competition is open to all undergraduate students.
Full details are announced each year by the Philosophical Society.

*The Westward Ho! Chapter I.O.D.E. Memorial Awards*

*Value*: $65 each.
*Number*: 2.
*Conditions*: Offered annually to students, toward expenses of attending the Banff Conference on World Development held in August of each year. Selection will be based on interest in this field of study and academic standing.
*Donor*: Endowed by the I.O.D.E. Chapter in Memory of Mrs. Cora Casselman, Mrs. J. M. Forbes and Mrs. W. C. Redmond.
*Apply*: Administrator of Student Awards by March 1.

*The French Government Scholarships*

*Value*: Tuition fees, living allowance and sea passage from France to Canada at conclusion of award.
*Number*: Variable.
*Conditions*: Available to Canadian graduates for study at a French university for one academic year. Applicants must have an adequate knowledge of French.
*Where tenable*: Any French University.
*Donor*: The Government of France.
*Apply*: Head, Department of Romance Languages by February 1. Nomination is made by the University to the Embassy of France in Ottawa.

*The German Academic Exchange Scholarship*

*Value*: Tuition fees, partial travel costs, and living allowance for twelve months beginning October. 1.
*Conditions*: Applicants must be Canadian citizens, have a first degree by the date of tenure, be between 18 and 32 years of age, and be sufficiently fluent in the German language.
*Where tenable*: At a German university or an Academy of Art or Music.
*Donor*: The Federal Republic of Germany.
*Apply*: By letter to the Administrator of Student Awards by December 1. Letter should include academic background, study plans in Germany and projected plans after return.

*The Bank of Nova Scotia Bilingual Exchange Scholarships*

*Value*: $1,500 for undergraduates and $2,500 for graduates.
*Number*: 6—three to French-speaking and three to English-speaking candidates.
*Conditions*: Undergraduate awards are tenable in the second last year of a normal undergraduate program. English-speaking winners may attend any Canadian French-speaking university or college, and French-speaking winners may attend any Canadian English-speaking university or college, provided that such institution is a member of, or federated with, or affiliated to a member of the Association of Universities and Colleges of Canada.
*Apply*: Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa 4, Ontario. Completed applications must be filed by March 15.

*Summer Session Students' Union Prizes*

*Value*: $100 each.
*Number*: 4.
*Conditions*: Offered annually to students graduating from The University of Alberta, with a Bachelor's degree for which the final requirements were completed by Summer Session. The awards will be made to those with the highest averages on the last five full-year courses (or equivalent) taken in Summer Sessions at The University of Alberta and counted towards the degree, provided that the grade point averages are not less than 7.0.
*Donor*: The Students' Union of Summer Session.

## 223.2.3 / EXTRACURRICULAR ACTIVITIES AWARDS

The following awards are based mainly on extracurricular activities. They are awarded by special committees and will be announced each year at Colour Night.

*Block A Club Athletic Award*

*Value*: $100.
*Conditions*: Awarded to a first year male student deemed outstanding in intercollegiate athletics. The recipient must also have a satisfactory academic standing (an average of not less than 5.5 as determined by all term examinations held prior to Colour Night) and must return for his second year at The University of Alberta.
*Apply*: Selection will be made by a committee appointed by the Block A Club.

*Lorne Calhoun Memorial Award*

*Value*: A silver shield and a book prize of $25.
*Conditions*: Awarded annually to a person who has made an outstanding contribution to student life in a broad variety of activities and whose academic standing is satisfactory. The current President of the Students' Union is not eligible.
*Donor*: The Students' Union. The distinctive silver shield was first awarded in 1952 to perpetuate the memory of Lorne Calhoun, B.A., a student of the University from 1946 until his death in 1951, who during that time was most active in extracurricular activities.

*The Walter Andrew Dinwoodie Award*

*Value*: A plaque plus $100.
*Conditions*: Awarded annually to an undergraduate in the second or subsequent year who is returning to The University of Alberta the following year in a full-time program. The basis of award will be satisfactory academic standing and an outstanding contribution to some phase of extracurricular activity, under the direction of the Students' Union, in the academic year in which the award is made.
*Donor*: The Students' Union—in memory of Mr. Dinwoodie, Business Manager of the Students' Union 1949 to 1962.

*The Florence E. Dodd Prize*

*Value*: $50.
*Conditions*: Offered to a woman student for satisfactory academic work and an outstanding contribution to student life through active participation in extracurricular activities.
*Donor*: Endowed by an anonymous donor in honor of Miss Dodd, a former Advisor to Women students at the University.

*The Lister Hall Women Residents' Association Prize*

*Value*: A silver tray plus $50.
*Conditions*: To be awarded annually to a member of the Association, other than the President, who has made an outstanding contribution to residence life through personal furtherance of the aims of the Association as stated in the constitution.

*The Reg Lister Trophy and Prize*

*Value*: $50 plus a trophy.
*Conditions*: Awarded to a male resident student who in the opinion of the Men's Residence Committee, in consultation with the Warden, has made a significant and worthwhile contribution to residence life, and who has maintained a satisfactory academic standing.
*Donor*: Endowed by Mrs. Lister.

*The Joseph Dolson Oliver Mothersill Memorial Awards*

*Value*: $200 each.
*Number*: Two, one to a man and one to a woman.
*Conditions*: Awarded for outstanding contribution to student life on the campus.
*Donor*: Endowed by the family of the late Mr. Mothersill.

*The Maimie Shaw Simpson Trophy*

*Conditions*: Awarded annually to a woman member of the Students' Union who has obtained at least second class standing in the previous academic year and has made an outstanding contribution to student life in a broad variety of activities.
*Donor*: The Students' Union in honor of Miss Simpson, first Dean of Women of The University of Alberta.

*The Women's Canadian Club of Edmonton Award*

*Value*: $100.
*Conditions*: Offered annually to a woman student, based on academic record and an outstanding contribution to the extracurricular activities on campus. The recipient must be returning to the University in the following academic year.

## 223.3 / *Faculty of Agriculture*

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Alberta Institute of Agrologists Gold Medal*

*Conditions*: Awarded to a graduating student primarily on the basis of academic standing for the final two years which must be not less than 7.0. Consideration may be given to qualities of leadership, personality, and character.

*The Western Canadian Society for Horticulture Medal*

*Field of study*: Horticulture.
*Value*: Medal and a five-year membership in the Society.
*Conditions*: Awarded annually to a student of outstanding merit graduating from the Department of Plant Science who has specialized in Horticulture. A gold medal will be given if 7.5 is achieved or a silver medal if 6.5 or better.

*The Frank A. Coates Memorial Prize*

*Field of study*: Horticulture.
*Value*: $100.
*Conditions*: Awarded annually to a student of outstanding merit graduating from the Faculty of Agriculture who has specialized in Horticulture. Preference will be given to a student from a rural home.
*Donor*: Endowed by Mrs. D. Enilda Peers in memory of her father.

*The Alberta Branch of the Canadian Seed Growers' Association Scholarship*

*Field of study*: Plant Science.
*Value*: $150.
*Conditions*: Awarded to a student entering third year in the Department of Plant Science based on the student's academic standing in the previous year.

*Alberta Dairymen's and Provincial Milk and Cream Producers' Association Tuition Scholarships*

*Field of study*: Food Science.
*Value*: Tuition fees each.
*Number*: 4.
*Conditions*: Offered annually to two students entering each of the third and fourth years of the Department of Food Science. The awards will be based on academic standing in the previous years.

*The Alberta Horticultural Association Prize*

*Field of study*: Horticulture.
*Value*: $100.
*Conditions*: Awarded annually to a student of outstanding merit entering the third or

fourth years of Plant Science and specializing in Horticulture.

*The Alberta Poultry Producers' Scholarship*

*Field of Study*: Poultry Science.
*Value*: $250.
*Conditions*: Offered to a student entering third year of Animal Science who will be specializing in the study of poultry. The award will be based on the academic work of the first two years in the Faculty. If no suitable candidate is available, the award may be renewed to the same student for the fourth year.

*The Dan Baker Bursaries*

*Value*: $300 each.
*Number*: 2.
*Conditions*: Offered to two students entering second, third or fourth year of the Faculty of Agriculture on a basis of academic standing, financial need and personal character.
*Donor*: Endowed by the late Dan Baker of Edmonton.
*Apply*: Administrator of Student Awards by June 15.

*The Board of Governors Scholarship in Agriculture*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the Faculty.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*The Canada Packers Scholarship*

*Value*: $500.
*Conditions*: Offered annually to a student entering fourth year of Agriculture with a preference to one who is majoring in a field of general interest to the packing industry.

*The Canadian Feed Manufacturers' Association (Alberta Division) Scholarship*

*Field of study*: Animal Science.
*Value*: $150.
*Conditions*: Offered to a student entering third year of Animal Science with a special interest in nutrition and based on his record in second year Agriculture.

*Cominco Scholarships*

*Field of study*: Honors Chemistry or Geology, Soil Science or Chemical, Mechanical, Mining or Metallurgical Engineering.
*Value*: $800 per year for two years.
*Number*: 2
*Conditions*: Offered to students of outstanding merit entering the third year of any of the above programs. Renewal for the fourth year is dependent on a satisfactory record in the third year.
*Donor*: Cominco Limited, Trail, B.C.
*Apply*: Administrator of Student Awards by June 15.

*The Entomological Society of Alberta Prize*

*Value*: $50.
*Conditions*: Offered to the student in any of the first three undergraduate years obtaining a high standing in one or more courses in Entomology. The award is conditional on a satisfactory general record.

*The Claude Gallinger Memorial Scholarship*

*Field of study*: Animal Science.
*Value*: $500.
*Conditions*: Offered annually to a student of outstanding merit completing second year in the Faculty of Agriculture and entering third year in the Department of Animal Science. Preference may be given to a married student.
*Donor*: Endowed by Miss Margaret Gallinger.

*The Robert Gardiner Memorial Scholarship*

*Value*: $200.
*Conditions*: Offered to a student of outstanding merit completing third year in the Faculty, provided at least 7.0 has been achieved. The recipient must be from a farm home, and preferably born in Alberta. Consideration may be given to qualities of leadership and character.
*Donor*: The United Farmers of Alberta in the memory of the late Robert Gardiner.

*The General Foods Limited Scholarship*

*Field of study*: Food Science.
*Value*: $500 per year for 2 years.
*Conditions*: Offered to a student of outstanding merit entering third year Food Science. The payment for fourth year will be dependent on satisfactory achievement in the third year.

*The Douglas Farquhar Johnston Bursaries in Agriculture*

*Field of study*: Animal Science.
*Value*: $500 each.
*Number*: 2.
*Conditions*: Offered annually to two students entering the final year of the Faculty of Agriculture, based on academic standing and financial need. Preference will be given to students in Animal Science.
*Donor*: Endowed by the late Mr. D. F. Johnston.
*Apply*: Administrator of Student Awards by June 15.

*The Ketchum Prize in Animal Science*

*Value*: $50.
*Conditions*: Awarded to a student of outstanding merit completing the third year in the Department of Animal Science.
*Donor*: Ketchum Mfg. Co. Limited of Ottawa.

*The N. A. Larsen Memorial Scholarship*

*Field of study*: Food Science.
*Value*: $500.
*Conditions*: Offered annually to a student entering third or fourth year in the Department of Food Science in a program including Food Chemistry, Food Microbiology, and Food Technology with preference being given to a student specializing in the latter. The award will be based on scholastic attainment during the years preceding the award.
*Donor*: The Estate of the late Mr. Larsen and the Central Alberta Dairy Pool.

*The Renkenberger Scholarship*

*Field of study*: Agriculture, Arts, Science, Education or Commerce.
*Value*: $250.
*Conditions*: Awarded to an undergraduate student who is especially interested in co-operative marketing. Basis of the award will be academic standing and participation in relevant extracurricular activities.
*Donor*: Bequest of the late Harvey Renkenberger of Barons, Alberta.
*Apply*: Administrator of Student Awards by June 15.

*The David Sidey Memorial Scholarship*

*Field of study*: Animal Science.
*Value*: $500.
*Conditions*: Offered annually to a student of outstanding merit whose home is in Alberta and who is entering third or fourth year of the Department of Animal Science.
*Donor*: Endowed by Miss Isabel Sidey of Olds, Alberta.

*The J. Macgregor Smith Scholarship*

*Value*: $500.
*Conditions*: Offered annually to a student of outstanding merit entering third or fourth year of the Faculty of Agriculture.
*Donor*: Endowed by the late Mrs. Smith.

*The J. K. Sutherland Memorial Scholarship*

*Value*: $100.
*Conditions*: Awarded to a student of outstanding merit completing third year provided that an average of at least 6.5 has been obtained.
*Donor*: Endowed by The Board of F.U.A. District No. 11 in memory of Mr. and Mrs. Sutherland of Hanna, Alberta.

*The Western Co-operative Fertilizers Limited Scholarship*

*Field of study*: Soil Science.
*Value*: $500.
*Conditions*: Offered annually to a Canadian student of outstanding merit entering fourth year in the Department of Soil Science.

## 223.4 / *Faculty of Arts*

### 223.4.1 / INTRODUCTORY NOTE

Awards open to all students in the Faculty of Arts are listed in § 23.4.2. Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

Awards in particular Arts subjects are listed in §§ 23.4.3 and following. They are open to students from any faculty registered in the relevant course.

### 223.4.2 / GENERAL AWARDS

*The Governor-General's Gold Medal*

*Conditions*: Awarded to the graduating student from an honors program in the Faculty of Arts who has shown the highest distinction in scholarship.
*Donor*: His Excellency, the Governor-General.

*The Dr. John Macdonald Gold Medal in Arts*

*Conditions*: Awarded annually to the graduating student from the general program in the Faculty of Arts who has shown the highest distinction in Scholarship.
*Donor*: Anonymous in honor of the former Dean of Arts and Science.

*The Board of Governors Scholarship in Arts*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the Faculty.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*The Mary Cameron Douglas Memorial Scholarship*

*Value*: $450.
*Conditions*: Awarded on the basis of outstanding merit to a student who is entering fourth year honors in the Faculty of Arts.
*Donor*: Endowed by the late James McCrie Douglas of Edmonton.

*The Edmonton Section of the Council of Jewish Women Scholarship*

*Value*: $100.
*Conditions*: Awarded to a student of outstanding merit completing the second year of an honors program, providing a G.P.A. of at least 7.0 is obtained.

*The John Mills Imrie Memorial Scholarship*

*Value*: $300.
*Conditions*: Awarded annually to a student of outstanding merit completing the first year of the Faculty of Arts.

*Donor*: Endowed for a period of ten years beginning 1963 by Mrs. Imrie and her daughter.

*Dr. Geneva Misener Memorial Scholarship*

*Field of study*: Classics or Modern Languages.
*Value*: $300.
*Conditions*: Awarded to a student of outstanding merit completing the third year of an honors program in Classics or Modern Languages, providing first class standing has been attained.
*Donor*: Bequest of the late Dr. Misener.

*The President's Scholarships*

*Field of study*: Arts, Science and Law.
*Value*: $450 each.
*Number*: 3.
*Conditions*: Awarded for outstanding academic merit, with no award to be made with less than G.P.A. 7.5. Preferably the awards will be given, one in the Faculty of Arts, one in Science and one in Law.
*Donor*: Endowed in 1943 by the late Mr. Justice H. H. Parlee.

*The Renkenberger Scholarship*

*Field of Study*: Agriculture, Arts, Science, Education or Commerce.
*Value*: $250.
*Conditions*: Awarded to an undergraduate student who is especially interested in co-operative marketing. Basis of the award will be academic standing and participation in relevant extracurricular activities.
*Donor*: Bequest of the late Harvey Renkenberger of Barons, Alberta.
*Apply*: Administrator of Student Awards by June 15.

*The Frederick A. Scherrer Scholarship in Arts*

*Value*: $500.
*Conditions*: Awarded on the basis of outstanding merit to a student entering fourth year honors, in the Faculty of Arts.
*Donor*: Endowed by the late Mr. F. A. Scherrer.

*The Sunwapta Broadcasting Limited Scholarship*

*Field of study*: Communications as related to the Broadcasting and Television Industry.
*Value*: $200.
*Conditions*: Open to students entering fourth year Electrical Engineering or Honors Physics, or entering third or fourth years in Arts who have an interest in journalism or script writing.
*Donor*: Dr. G. R. A. Rice.
*Apply*: Administrator of Student Awards by June 15.

## 223.4.3 / ART

*The Fuller Brush Company Scholarship in Art*

*Value*: $200.
*Conditions*: Offered to a student of outstanding merit entering either the second or third year of the B.A. in Art or B.F.A., or the third or fourth year of the Faculty of Education, majoring in Art, provided that said student is registered in a full year's program.

*The University of Alberta Alumni Prize in Fine Arts*

*Value*: $100.
*Conditions*: Offered annually to the student in the B.A. in Art or B.F.A. who has demonstrated the best progress. Financial need may be considered in making the award.

## 223.4.4 / CLASSICS

*The Monica Jones Aamodt Prize in Classics 354*

*Value*: $50 book prize.
*Conditions*: Awarded to the student obtaining the highest mark in Classics 354, provided that standing obtained meets with the approval of the Faculty Council.
*Donor*: Endowed by the Delta Delta Delta Alumnae, in honor of Mrs. Monica Jones Aamodt, the organizer of the fraternity on this campus.

*The Ahepa Prize in Greek*

*Value*: $50.
*Conditions*: Awarded to the student in Greek 200 or Greek 300 who secures the highest standing in a special examination in sight translation from English to Greek and from Greek to English provided that the student continues in senior Greek courses. If there is no suitable candidate from either Greek course, the Department of Classics may, at their discretion, award the scholarship to a student in other courses in Greek.
*Donor*: Anglo-Hellenic Association in Western Canada.

*The Emily Sereth Lieberman Memorial Prize in Classics*

*Value*: $150.
*Conditions*: Awarded to a student for outstanding merit in Classics 350, provided the student's record is otherwise satisfactory.
*Donor*: Endowed by the family and friends of the late Mrs. Lieberman.

## 223.4.5 / DRAMA

*The Friends of the Theatre Bursaries*

*Field of Study*: Drama.
*Value*: $300 each.
*Number*: Variable.
*Conditions*: Available to students entering second, third or fourth year of the Bachelor of Fine Arts in Drama program on a basis of academic standing and financial need.

*The Duncan Alexander MacGibbon Gold Medal in Economics*

*Conditions*: Awarded annually to the student graduating with highest distinction from Honors Economics.
*Donor*: Endowed by Dr. D. A. MacGibbon of Hamilton, Ontario.

223.4.7 / ENGLISH

*The Rutherford Memorial Gold Medal in English*

*Conditions*: Offered to a student of outstanding merit graduating from the Honors English program, with at least first class standing.
*Donor*: Mrs. Cecil Rutherford, Edmonton, in memory of the late Honorable Alexander Cameron Rutherford.

*The Aiken Scholarship in English Language and Literature*

*Value*: $100.
*Conditions*: Awarded to an outstanding student entering third year Honors English, providing a grade of 6 or better has been achieved in all English courses.
*Donor*: Endowed by the late Sir James Aiken.

*Beta Sigma Phi Canadian Chapter, Scholarship in English*

*Value*: $1000 each.
*Number*: Three, of which one is restricted to Western Canada.
*Conditions*: Open to students entering the fourth year of an Honors English program on the basis of academic achievement and confidential recommendation by the Department.
*Apply*: Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa 4, Ontario.

*The James Patrick Folinsbee Prize in English*

*Value*: $100.
*Conditions*: Offered annually to a student in English 396 whose writing shows greatest merit provided the student's record is otherwise satisfactory.
*Donor*: Endowed by the late Dr. F. J. Folinsbee.

*The R. K. Gordon Prize in Chaucer*

*Value*: $100.
*Conditions*: Awarded annually for outstanding academic standing in English 316 (Chaucer).
*Donor*: The Friends of the University, in honor of Professor Emeritus Gordon.

*The Priscilla Hammond Memorial Scholarship in Honors English*

*Value*: $500.
*Conditions*: Awarded to the student entering final year Honors English who in the judgment of the department shows the greatest ability and promise in the field of English scholarship or in creative work in English.
*Donor*: Endowed by Mrs. Edith Hammond, in memory of her daughter.

*The J. T. Jones Prize in Milton*

*Value*: $50.
*Conditions*: Awarded annually to the student with the highest standing in English 340, provided that his academic record is otherwise satisfactory. If there is no suitable candidate, no award will be made.
*Donor*: Endowed by friends of John Thomas Jones, in recognition of his service in the Department of English 1922-1964.

*The F. M. Salter Memorial Prize in Renaissance Literature*

*Value*: $100.
*Conditions*: Offered to a student of outstanding merit in English 324 or 322 or 390, provided that the student's academic record is otherwise satisfactory.
*Donor*: Endowed by friends of the late Dr. Salter, formerly head of the Department.

*The Charles James Thompson Memorial Prize*

*Value*: $20.
*Conditions*: Awarded to the undergraduate in the Faculty of Agriculture having the best record in English 210, provided that the student is taking a full year's work and passes all subjects.
*Donor*: Miss E. Nancy Thompson.

223.4.8 / GEOGRAPHY

See under Faculty of Science awards, § 223.18.5.

223.4.9 / GERMANIC LANGUAGES

*The German Government Book Prizes*

*Number*: 2.
*Conditions*: Offered annually to students for outstanding merit in German Literature courses provided that these students obtain a grade of not less than 7 in these courses, are carrying a full year's work and have a record satisfactory to the Faculty Council. A prize may not be given to the same student more than once.

*The Minister of Switzerland's Book Prize in German*

*Conditions*: Offered annually to a student for outstanding merit in senior German Literature courses, provided such student's record is otherwise satisfactory.

## 223.4.10 / HISTORY

*Gordon Stanley Fife Memorial Prize*

*Value*: $100.
*Conditions*: Awarded to the graduating student who has taken the highest average mark in two or more senior history courses.
*Donor*: Endowed by members of the family.

*The A. L. Burt Prize*

*Value*: $50.
*Conditions*: Offered to the student who obtains the highest mark on the final examination in the history course of the first year, provided he has achieved first class standing and passes all other courses.
*Donor*: Endowed by the History Club in honor of its founder.

*The Ross William Collins Memorial Book Prize*

*Value*: $50.
*Conditions*: Awarded to a student of outstanding merit in Renaissance and Reformation History provided the student achieves first class standing in the courses and his other work is satisfactory.
*Donor*: Mrs. M. H. Long.

*The Trenholme Dickson and Letitia S. Dickson Prize*

*Value*: $40.
*Conditions*: Offered to a student of outstanding merit in the field of Canadian History, provided he attains first class standing and passes his other subjects.
*Donor*: Endowed by the late Letitia S. Dickson.

*The History Club Prize*

*Value*: $25.
*Conditions*: Offered to the student who obtains the second highest mark in the final examination in the history course of the first year, provided he achieves first class standing and passes all other courses.

*The Morden Heaton Long Prize*

*Value*: $50.
*Conditions*: Offered annually to a student of outstanding merit in British History provided that the student's record is otherwise satisfactory.
*Donor*: Friends of the late Professor Emeritus of History.

*The Morden Heaton Long Memorial Prize in Honors History*

*Value*: $100.
*Conditions*: Offered to the third year honors student with the best record, conditional upon his registration in the fourth year of Honors History.
*Donor*: Mrs. Winnifred Long, in memory of her late husband, a former head of the Department of History.

*The Harold W. Riley Memorial Scholarship*

*Value*: $200.
*Conditions*: Offered annually to a student of outstanding merit who has shown a special interest in the history of Western Canada, provided his record is otherwise satisfactory.
*Donor*: Endowed by the late Mrs. Riley.

*George Malcolm Smith Memorial Book Prize*

*Value*: $50.
*Conditions*: Awarded to a student of outstanding merit in Modern European History, provided that the student takes first-class standing in the course, is carrying a full year's work and passes all his other subjects.
*Donor*: Mrs. M. H. Long.

*The John Henry Stanley Memorial Prize*

*Value*: $50.
*Conditions*: Awarded annually to a student of outstanding merit in Canadian History, provided this student is taking a full year's work and passes all other subjects.
*Donor*: Endowed by Dr. George F. G. Stanley in memory of his father.

## 223.4.11 / MATHEMATICS

See under Faculty of Science awards, § 223.18.7.

## 223.4.12 / MUSIC

*The Peace River Pioneer Memorial Scholarship in Music*

*Value*: $300.
*Conditions*: Awarded annually to a student of outstanding merit completing the first, second or third year of the Bachelor of Music program. The Department may, at its discretion, divide the award.
*Donor*: Endowed by Mr. Charles Plavin, North Star, Alberta.

*The Eva Shaw Memorial Prize in Music*

*Value*: $50.
*Conditions*: Awarded annually to a student of outstanding merit in any year of the Bachelor of Music program.
*Donor*: The children of the late Mrs. Roy Shaw.

*The Women's Committee of the Edmonton Symphony Society Scholarships*

*Value*: $250 each.
*Number*: 3.
*Conditions*: Offered annually on a basis of musical merit, to three students, one entering each of second, third, and fourth years of the Bachelor of Music program and majoring in orchestral instruments.

## 223.4.13 / PHILOSOPHY

*The MacEachran Gold Medal in Philosophy*

*Conditions*: Offered to the student graduating with Honors in Philosophy or Philosophy and Greek with the highest standing in the last two years of the program, provided first class standing is attained.
*Donor*: Professor Emeritus J. M. MacEachran.

*The William Irvine Memorial Prize in Ethics*

*Value*: $100.
*Conditions*: Offered to a student of outstanding merit in Philosophy 354, provided that the student's academic record is otherwise satisfactory.
*Donor*: Endowed by friends of the late Mr. Irvine.

## 223.4.14 / POLITICAL SCIENCE

*The Duncan Alexander MacGibbon Gold Medal in Political Science*

*Conditions*: Awarded to the student graduating from Honors Political Science with highest distinction.
*Donor*: Endowed by Dr. D. A. MacGibbon of Hamilton, Ontario.

*The Twentieth Century Women's Liberal Club Prize*

*Value*: $50.
*Conditions*: Offered to the student with the highest standing in Political Science 320, "Government of Canada", provided that his record is otherwise satisfactory.

## 223.4.15 / PSYCHOLOGY

*The MacEachran Gold Medal in Psychology*

*Conditions*: Awarded to the student graduating from Honors Psychology with the highest standing on the final two years of the program, provided first class standing is attained.
*Donor*: Professor Emeritus J. M. MacEachran.

## 223.4.16 / ROMANCE LANGUAGES

*The Bronze Medal in French*

*Conditions*: Awarded each year to a student of French 450 who writes the best essay on a contemporary author.
*Donor*: The Consul of France in Alberta.

*The Belgian Government Book Prize*

*Conditions*: Offered to the student who obtains the highest standing in French 360 provided that the student's record is satisfactory.

*The French Government Book Prize*

*Conditions*: Awarded to the student with the highest standing in French 200, provided such student's record is satisfactory to the Faculty Council.

*The Minister of Switzerland's Book Prize in French*

*Conditions*: Offered annually to the student with the highest standing in French 375 or 380, provided that the student's record is otherwise satisfactory to the Faculty Council.

## 223.4.17 / SLAVONIC LANGUAGES

*The Royal Canadian Legion, Norwood Branch, Prizes in Ukrainian*

*Value*: $100 each.
*Number*: 4.
*Conditions*: Awarded annually to students of outstanding merit, three in Ukrainian 100 and one in Ukrainian 300; awards to be based on marks in these courses only.

*The Ukrainian Canadian Committee Prize*

*Value*: $100.
*Conditions*: Offered to a student of outstanding merit in Ukrainian Literature 360, provided the student's record is otherwise satisfactory.

*The Ukrainian Catholic Women's Prize*

*Value*: $100.
*Conditions*: Awarded to the student with the highest standing in Ukrainian 100, provided that the student's record is otherwise satisfactory.

*The Ukrainian National Association Prize*

*Value*: $100.
*Conditions*: Offered to a student of outstanding merit in Ukrainian Literature 360, provided the student's record is otherwise satisfactory.

*The Ukrainian Women's Association of Canada (Alberta Branch) Prize*

*Value*: $100.
*Conditions*: Offered to a student of outstanding merit in Ukrainian 300 provided that the student's record is otherwise satisfactory.

## 223.4.18 / SOCIOLOGY

*The Samuel M. Strong Gold Medal in Sociology*

*Conditions*: Awarded to the student graduating from Honors Sociology with the highest standing on the final two years. The medal will be awarded only if the student attains first class standing, otherwise a book prize of $25 will be provided.
*Donor*: Endowed by friends of the late Dr. Strong.

*The Tammy Usiskin Memorial Prize*

*Field of Study*: Gerontology.
*Value*: $50.
*Conditions*: Offered annually to a student on the basis of either an essay for the Departmental publication "Variables" or for outstanding undergraduate course work in the field of Gerontology.
*Donor*: Edmonton section, Council of Jewish Women.

## 223.5 / *Faculty of Business Administration and Commerce*

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Eaton's of Canada Gold Medal in Commerce*

*Conditions*: Awarded to the graduating student who obtains the highest standing in the courses of the final two years.

*The Board of Governors Scholarship in Business Administration and Commerce*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the Faculty.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*The Business and Professional Women's Club, Edmonton Branch, Scholarship*

*Value*: $100.
*Conditions*: Offered annually to a woman student completing first, second or third year in the Faculty of Business Administration and Commerce, based on her performance during the year just completed.

*The Dominion Stores Limited Scholarship*

*Field of Study*: Finance.
*Value*: $250 per year for 2 years.
*Conditions*: Offered to a student entering third year of the degree program for Bachelor of Commerce in Finance, based on outstanding merit in the courses of the first two years. The second payment will depend on at least 6.5 being achieved in third year.

*The Faculty of Business Administration and Commerce Bursary Fund*

*Value*: $350 to $1,000.
*Number*: Variable.
*Conditions*: Awards may be available to students entering the third or fourth years, and will be made on the basis of academic standing and financial need.
*Donor*: Members and friends of the Faculty.
*Apply*: Administrator of Student Awards by June 15.

*The Gill Interprovincial Lines Ltd. Centennial Scholarship*

*Value*: $250.
*Number*: One in each even-numbered year.
*Conditions*: Offered to a student of outstanding merit completing third year and entering fourth year in the Faculty of Business Administration and Commerce. The recipient should be specializing in finance or economics and, if possible, with a particular

interest in the field of highway transportation.

*Hudson's Bay Company Tuition Awards in Commerce*

*Value*: Tuition and fees for fourth year.
*Number*: 2.
*Conditions*: Offered to students having an interest in a merchandising career on the basis of academic standing and potential executive ability. Winners of the awards will be offered full-time employment during the summer preceding the fourth year.
*Donor*: Hudson's Bay Company, Edmonton, Alberta.
*Apply*: Dean of Commerce by February 15.

*The Industrial Acceptance Corporation Limited Scholarship*

*Value*: $250 per year for 2 years.
*Conditions*: Offered to a student entering third year of the Bachelor of Commerce (General) program based on outstanding merit in the courses of the first two years. The second payment will be dependent on at least 6.5 being achieved in third year.

*The Institute of Chartered Accountants of Alberta Scholarship*

*Field of Study*: Accounting.
*Value*: $150.
*Conditions*: Awarded to a student of outstanding merit entering the third year of the Bachelor of Commerce program in Accounting, based on the work of the first two years.

*The Lennie M. McNeill Memorial Scholarship*

*Value*: $100.
*Conditions*: Awarded to a woman student of outstanding merit completing first, second or third year in the Faculty of Business Administration and Commerce, based on her performance in the year just completed.
*Donor*: The Soroptimist Club of Edmonton.

*The Marsh & McLennan Limited Centennial Scholarship*

*Value*: $250.
*Conditions*: Offered to a student of outstanding merit entering second year, based on the results of the first year, in the Faculty of Business Administration and Commerce.
*Donor*: Marsh & McLennan Limited, of Calgary, as a mark of Canada's Centennial year.

*The Renkenberger Scholarship*

*Field of Study*: Agriculture, Arts, Science, Education, or Commerce.
*Value*: $250.
*Conditions*: Open to undergraduates in any of the above faculties who are interested in co-operative marketing. The basis of award will be academic standing and participation in relevant extracurricular activities.
*Apply*: Administrator of Student Awards by June 15.

*The Riddell, Stead, Graham and Hutchison Scholarship*

*Field of Study*: Accounting.
*Value*: $500.
*Conditions*: Awarded to a student entering the final year of the program leading to the degree of Bachelor of Commerce in Accounting who has indicated an intention to proceed into chartered accountancy after graduation. Selection will be made on a basis of academic record and personal suitability for the profession.

*The Thorne, Gunn, Helliwell and Christenson Scholarship*

*Field of Study*: Accounting.
*Value*: $150 per year for 2 years.
*Conditions*: Offered annually to a student entering third year of the Bachelor of Commerce program in Accounting, for outstanding merit in the work of the first and second years. The second payment will be dependent on at least 6.5 being achieved in third year.

*The Touche, Ross, Bailey and Smart Scholarship*

*Field of Study*: Accounting.
*Value*: $300.
*Conditions*: Awarded to a student entering the final year of the program leading to the degree of Bachelor of Commerce in Accounting who has indicated an intention to proceed into chartered accountancy after graduation. Selection will be made on a basis of academic record and personal suitability for the profession.

*The Winspear, Higgins, Stevenson and Doane Scholarship*

*Field of Study*: Accounting.
*Value*: $250 per year for 2 years.
*Conditions*: Offered to a student entering third year of the degree program for Bachelor of Commerce in Accounting, on the basis of outstanding merit in the courses of the first two years. The second payment will depend on at least 6.5 G.P.A. being achieved in the third year.

## 223.6.1 / UNDERGRADUATE AWARDS

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Alberta Dental Association Gold Medal*

*Conditions*: Awarded to a graduating student for outstanding merit in the work of the fourth year, provided that at least 7.0 is attained.

*The Arthur D. Cumming Gold Medal*

*Field of Study*: Dentistry for children.
*Conditions*: Awarded to a graduating student for outstanding merit in Dentistry for children, provided that at least 7.0 G.P.A. is attained on the final year.
*Donor*: Endowed by the late Mr. Cumming of Calgary.

*The American Academy of Dental Medicine Award*

*Value*: A five-year subscription to the "Journal of Dental Medicine".
*Conditions*: Awarded to the graduating student who has displayed the greatest interest in dental medicine.

*The American Society of Dentistry for Children Award*

*Value*: Certificate and one-year subscription to "American Journal of Dentistry for Children".
*Conditions*: Awarded to a student of outstanding merit in dentistry for children, in the fourth year.

*The Canadian Dental Association War Memorial Essay Prizes*

*Value*: 1 of $200 and 1 of $100.
*Conditions*: Prizes will be awarded for the best essays written by fourth year dental students throughout Canada upon a topic to be announced in September of each year. This essay is part of the requirements of fourth year students in the Faculty.
*Donor*: The Canadian Dental Association as a memorial to Canadian dentists who lost their lives in the two world wars.
*Apply*: Further information may be obtained from the Dean of the Faculty of Dentistry, or from the Administrator of Student Awards.

*The Canadian Society of Dentistry for Children Certificate*

*Conditions*: Awarded to a student of outstanding merit in dentistry for children, in the fourth year.

*The Alberta Dental Association Pre-professional Scholarship*

*Value*: $300.
*Conditions*: Offered to a student entering first year Dentistry who has shown outstanding merit in the pre-professional work at The University of Alberta, provided that the student has attained a G.P.A. of 7.0 or better over the two years.

*The Alberta Dental Association Prize*

*Value*: $50.
*Conditions*: Awarded for outstanding merit in the work of the second year, provided that at least 7.0 is obtained.

*The Alberta Dental Association Scholarships*

*Value*: $200 each.
*Number*: 3.
*Conditions*: Awarded to students of outstanding merit in the course work of each of the first, second and third years.

*The Board of Governors Scholarship in Dentistry*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the Faculty.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*The Harry Ernest Bulyea Scholarship*

*Field of Study*: Operative and Restorative Dentistry.
*Value*: $100.
*Conditions*: Offered to the third-year student with the highest average mark in all courses in Operative and Restorative Dentistry.
*Donor*: The University of Alberta Dental Alumni Association in memory of the first Director of the School of Dentistry.

*The Calgary and District Dental Society Scholarship*

*Value*: $100.
*Conditions*: Offered annually to a student entering third year who shows outstanding merit in the basic science courses of the first two years of Dentistry, provided that he achieves 7.0 or better in these courses.

*The Arthur D. Cumming Scholarships*

*Value*: $200 each.
*Number*: 4.
*Conditions*: Awarded as follows: (1) $200 to a student entering first year Dentistry for outstanding merit in the pre-professional work at The University of Alberta, provided at least 6.5 has been achieved. (2) $200 to one student entering each of the second, third and fourth years based on the work of the preceding year.
*Donor*: Endowed by the late Mr. Cumming of Calgary.

*The Dean's Scholarship in Dentistry*

*Value*: $300.
*Conditions*: Open to students entering fourth year Dentistry on the basis of academic standing and financial need.
*Donor*: Anonymous.
*Apply*: Administrator of Student Awards by June 15.

*The Dental Class of '41 Prize*

*Field of Study*: Oral Diagnosis.
*Value*: $50.
*Conditions*: Offered to a student entering fourth year for proficiency in Oral Diagnosis.
*Donor*: Endowed by the Dental Class of 1941.

*The Dental Class of 1950 Bursary*

*Value*: Approximately $200.
*Conditions*: Offered to a student who has completed the second year and is entering the third year in the Faculty of Dentistry on the basis of academic standing and financial need.
*Donor*: Endowed by the Dental Class of 1950 through Canada Permanent Trust.

*The Edmonton and District Dental Society Prizes*

*Value*: $100 each.
*Number*: 3.
*Conditions*: Prizes are awarded for (1) outstanding merit in the first year; (2) outstanding merit in the third year; (3) outstanding merit in Periodontics in the graduating year, provided that, in all cases, at least 7.0 is achieved. General character and interest in student activities may be taken into consideration.

*The M. H. Garvin Scholarship Fund in Dentistry*

*Value*: Variable.
*Number*: Variable.
*Conditions*: Open to undergraduates in the Faculty of Dentistry or graduates of the most recent year, to encourage study or research. Awards will be based on academic standing, professional and personal qualifications and financial need. Awards must be approved by the donor.
*Donor*: The Western Canada Dental Society has established a fund at The University of Alberta.
*Apply*: Dean of the Faculty of Dentistry.

*The Harry Alexander Gilchrist Scholarship*

*Field of Study*: Prosthetic Dentistry.
*Value*: .$100.
*Conditions*: Offered to the third year student with the highest average mark in all courses in Prosthetic Dentistry.
*Donor*: The University of Alberta Dental Alumni Association, in memory of the former Professor of Dentistry.

*The Elizabeth and Wesley Haynes Prize*

*Value*: $50.
*Conditions*: Offered to a student entering first year Dentistry based on work in the pre-professional studies at The University of Alberta.
*Donor*: Dr. W. S. Haynes, M.Sc., M.D.

*The International College of Dentists (Canadian Section) Scholarship*

*Value*: $100.
*Conditions*: Offered annually to a student completing the third year of Dentistry, on a basis of outstanding merit in that year, general character, and participation in extracurricular activities.

*The Dr. R. R. McIntyre Memorial Scholarship*

*Field of Study*: Interceptive and Preventive Orthodontics.
*Value*: $200.
*Conditions*: Awarded to a student completing third year Dentistry for outstanding merit in Interceptive and Preventive Orthodontics, provided that at least 7.0 has been attained on the whole year's work.
*Donor*: Calgary and District Dental Society.

*The C. V. Mosby Book Awards*

*Value*: $30 in books each.
*Number*: 4.
*Conditions*: Awarded annually to students of outstanding merit in the Faculty of Dentistry.
*Donor*: C. V. Mosby Company Ltd.

*The Prize in Restorative Dentistry*

*Value*: $50.
*Conditions*: Awarded annually for outstanding merit in Restorative Dentistry in the third year.
*Donor*: Dr. M. Kahn, Vancouver.

## 223.6.2 / GRADUATE AWARDS IN DENTISTRY

(For other general graduate awards refer to § 224 of the Awards Calendar or the Graduate Studies Calendar).

*The Postgraduate Scholarship Fund in Dentistry* has been established through the generosity of members of the Dental profession. The purpose of this fund is to assist dental graduates in pursuing postgraduate studies at other institutions in preparation for teaching. Younger persons will be given preference. Applications should be made to the Dean. All applications must be submitted to the Council of the Faculty of Dentistry for approval.

*The Canadian Dental Association Fellowships and Studentships.* The Canadian Dental Association offers fellowships and studentships to suitable students or graduates who desire to prepare themselves further for scientific research by continuing their

study in the sciences fundamental to their research fields.

(a) Fellowships are for an academic year of special study in the fundamental sciences or for travel to visit outstanding authorities or to attend research conferences.
(b) Studentships are for summer or part-time employment as an assistant in a recognized research laboratory.

Factors considered in making the awards are: evidence of capacity for original research, and scholastic ability in scientific fields.

The candidate shall state the institution at which he intends to study and the general line of work to be followed. A transcript of university record and a letter of recommendation from the dean of a dental school should accompany the application.

Apply to Canadian Dental Association, 234 St. George Street, Toronto 5, Ontario by April 1.

*The National Research Council Dental Fellowships.* The Council offers a limited number of fellowships to provide advanced training and research in the sciences basic to Dentistry (not including clinical training). The basic amount is $3,500 which may be increased for each year of additional qualification. Applicants must be graduates in Dentistry, Medicine or Veterinary Medicine.

Application forms may be obtained from the Council or from the office of the Dean of Dentistry. They must be received complete by January 15 by the Secretary, Associate Committee on Dental Research, National Research Council, Ottawa 7, Ontario.

## 223.7 / *School of Dental Hygiene*

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

### *The Dental Hygiene Gold Medal and Prize*

*Value*: Gold Medal plus $50.
*Conditions*: Awarded to the student graduating with the highest standing from the School of Dental Hygiene.
*Donor*: Alberta Dental Association.

### *The Alberta Dental Association Prize in Dental Hygiene*

*Value*: $100.
*Conditions*: Offered annually to a student of outstanding merit entering second year in the School of Dental Hygiene.

### *The Board of Governors Scholarship in Dental Hygiene*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of first year of the School.
*Donor*: The Escheated Estates Fund of The University of Alberta.

### *The Dr. M. J. Lipkind Prize for General Proficiency*

*Value*: $75.
*Conditions*: Offered annually to a student entering second year for general proficiency in the first year.
*Donor*: Dr. M. J. Lipkind, Calgary.

### *The C. V. Mosby Book Award*

*Value*: $30 in books.
*Conditions*: Awarded to a student for outstanding merit in the first year.
*Donor*: C. V. Mosby Company Ltd.

## 223.8 / *Faculty of Education*

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

### *The Milton Ezra LaZerte Gold Medal and Scholarship*

*Value*: Gold Medal and a $500 scholarship.
*Conditions*: The medal is awarded to the student who has shown the highest general proficiency in the final year of the Bachelor of Education program. The scholarship will be paid to the recipient upon his or her registration for intramural graduate study at a university of recognized standing, provided that such study be commenced not later than two years following the award.
*Donor*: Alberta Teachers' Association in honor of the former Dean of the Faculty.

### *The Administrative Management Society Scholarship in Business Education*

*Value*: $200.
*Conditions*: Offered annually to a student of outstanding merit completing the first, second or third year of the B.Ed. program who has been and will continue to be majoring in Business Education and who expresses an intention to pursue a teaching career in Business Education.
*Donor*: Edmonton Chapter, A.M.S.

### *Alberta Teachers' Association Scholarships to Students in Education*

*Value*: $500 each.
*Number*: 4.
*Conditions*: Offered to bona fide residents of Alberta proceeding immediately from the third to the fourth year in the Bachelor of Education intramural program. Applicants must have a minimum average of 70% or equivalent and state an intention to follow teaching as a career.
*Where tenable*: Any Alberta University.
*Apply*: Executive Secretary, Alberta Teachers' Association, Barnett House, Edmonton, by May 15.

### *Alberta Teachers' Association Scholarships to Teachers in the Field*

*Value*: $500 each.
*Number*: 4.
*Conditions*: Offered to teachers in the field who, having completed three years of training and holding a permanent Alberta Teaching certificate, are proceeding to the fourth year of the Bachelor of Education intramural program. Applicants must be bona fide residents of Alberta, have a minimum average of 70% (or equivalent) and state an intention to follow teaching as a career. The scholarships must be taken up within one year after the award is made.
*Where tenable*: Any Alberta university.
*Apply*: Executive Secretary, Alberta Teachers' Association, Barnett House, Edmonton, by May 15.

### *The Board of Governors Scholarship in Education*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the Faculty.
*Donor*: The Escheated Estates Fund of The University of Alberta.

### *The Crown Zellerbach Canada Limited Scholarship in Education*

*Value*: $500.
*Conditions*: Offered annually to a Canadian student of outstanding merit who holds an undergraduate degree from an Alberta university and who is proceeding in the Faculty of Education towards a Professional Certificate.
*Apply*: Administrator of Student Awards by June 15.

### *The Edmonton Jewish Community Council Scholarship*

*Field of study*: Household Economics in Education.
*Value*: $100.
*Conditions*: Offered annually to a student of outstanding merit in the second year B.Ed. program with options in Household Economics. If no suitable candidate is found in this program, the award may be made in any second year program.

### *The Education Society of Edmonton Scholarship*

*Value*: $200.
*Conditions*: Offered annually to a student completing first year of the Bachelor of Education program and proceeding into second year in the succeeding academic session. The basis of award will be academic standing and promise of professional competence.

### *The Fuller Brush Company Scholarship in Art*

*Value*: $200.
*Conditions*: Awarded to a student of outstanding merit entering the second or third year of the B.A. in Art or the Bachelor of Fine Arts, or the third or fourth year of the B.Ed. majoring in Art, provided such a student is registered in a full year's program.

### *The Isidore Goresky Scholarship*

*Field of study*: Ukrainian Language in Education.
*Value*: $300.
*Conditions*: Offered to a student of outstanding merit majoring in the teaching of the Ukrainian language. The recipient may be

either entering second year in the Faculty of Education or a student with an undergraduate degree proceeding in the Faculty of Education towards a Professional Certificate.
*Donor*: The family of Mr. Goresky.
*Apply*: Administrator of Student Awards by June 15.

*The Florence Hallock Memorial Prize*

*Field of study*: Household Economics in Education.
*Value*: $125.
*Conditions*: Offered annually to a student of outstanding merit completing the first year and entering the second year of the Faculty of Education with a major in Household Economics.
*Donor*: Edmonton Home Economics Association.

*The Dr. G. Fred McNally Scholarship in Industrial Arts*

*Value*: $250.
*Conditions*: Offered to a student of outstanding academic merit completing the first year of the Industrial Arts program in the Faculty of Education.
*Donor*: The Friends of the University.

*The Renkenberger Scholarship*

*Field of study*: Agriculture, Arts, Science, Education or Commerce.
*Value*: $250.
*Conditions*: Awarded to an undergraduate student who is especially interested in co-operative marketing. Basis of the award will be academic standing and participation in relevant extracurricular activities.
*Donor*: Bequest of the late Harvey Renkenberger of Barons, Alberta.
*Apply*: Administrator of Student Awards by June 15.

*The Hazel Robinson Memorial Prize*

*Field of study*: English in Education.
*Value*: $100.
*Conditions*: Offered annually to a student completing the second year of the B.Ed program, based on work done in English, with emphasis being placed on creative writing.
*Donor*: Friends of the late Miss Robinson.

*The University Scholarship in Education*

*Value*: $300.
*Conditions*: Offered to a student of outstanding merit completing the second year of the elementary route of the Bachelor of Education and proceeding into the third year in the immediate next session, provided at least 7.0 was achieved on the second year.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*Local School Board Assistance*

*Conditions*: Some local School Boards provide bursaries or loans to students in Education programs. Students should inquire of any School Board in which they might be interested.

## 223.9 / *Faculty of Engineering*

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

### *The Henry Birks and Sons, Limited, Gold Medal*

*Conditions*: Awarded to a graduating student from the Faculty of Engineering on a basis of academic standing in the final two years (grade-point average not less than 7.0) and qualities of leadership and character.

### *The Association of Professional Engineers of Alberta Gold Medals*

*Number*: 6.
*Conditions*: Awarded to a graduating student from each of the Departments of Chemical, Civil, Electrical, Mechanical, Metallurgical and Mining Engineering. The basis will be the academic record of the third and fourth years combined, which must be a grade-point average not less than 7.0. The right is reserved to withhold the awarding of any or all medals.

### *The Canadian Construction Association Essay Prize*

*Value*: $50 and an "Engineers Handbook".
*Conditions*: Awarded annually for the best essay on a subject related to construction, by a student in the final year of the Faculty of Engineering. Essays may be those requisite to the program or written especially. Selection will be made by the Faculty and the winning essay will then be eligible for a prize of $100 on a Canada-wide basis.
*Apply*: Essays to be submitted to the office of the Dean by April 15.

### *The Jessie E. Paull Memorial Prize*

*Field of study*: Highway Engineering.
*Value*: $50.
*Conditions*: Offered annually to the student obtaining the highest standing in Civil Engineering 410 provided that the student obtains a grade of at least 7 in this subject and is registered in a full year's program.
*Donor*: Endowed by Mr. A. M. Paull, formerly Chief Highway Construction Engineer, Province of Alberta.

### *The Prize in Eng. P. 459*

*Value*: $50.
*Conditions*: Awarded each year to a graduating student in Engineering, based on the performance in the course named, provided that the student has obtained a grade-point average of not less than 6.5 in the full final year.
*Donor*: Anonymous.

### *The Society of Chemical Industry Merit Awards*

*Field of study*: Biochemistry, Chemistry and Chemical Engineering.
*Value*: A gold key, and a year's subscription to "Chemistry and Industry".
*Number*: 3.
*Conditions*: Awards will be made to the student graduating with the highest standing in each of Honors Biochemistry, Honors Chemistry and Chemical Engineering provided an average of 7.0 is attained in the final year, and that the program has been completed in the normal number of years.

### *The Aluminum Company of Canada Limited Scholarship*

*Field of study*: Chemical, Mechanical, Electrical, or Metallurgical Engineering or Honors Chemistry, Physics or Mathematics.
*Value*: $500 plus a grant of $300 to the University.
*Conditions*: The award is based on academic standing, financial need, and general character of the applicant.
*Apply*: Administrator of Student Awards by June 15.

### *American Society for Testing Materials Prize Awards*

*Field of study*: Materials.
*Value*: One-year membership in the Society, a certificate, eight issues of A.S.T.M. Bulletin and two books from a selected list on standards and materials.
*Number*: 4.
*Conditions*: Offered annually on the basis of demonstrated ability and interest in the field of materials, selection being made on the basis of performance in courses in materials: Met. E. 252, Ch. E. 252, Met. E. 361 and C.E. 455; or on the basis of a summer report on a topic related to materials.

### *R. Angus Alberta Limited Scholarship*

*Field of study*: Civil Engineering (Highway options).
*Value*: $500.
*Conditions*: Awarded to a student of outstanding merit entering fourth year Civil Engineering and registered in the elective courses in Highway Engineering. To qualify, the student must have achieved an average of 7.0 on the complete third year program in the Department.

### *The Association of Professional Engineers of Alberta H. R. Webb Memorial Scholarship*

*Value*: Tuition and fees.
*Conditions*: Offered annually to a student completing the first and entering the second year of the Faculty of Engineering.
*Donor*: The Association in memory of Professor H. R. Webb, formerly Registrar of the Association.

*The Black, Sivalls and Bryson Limited Redman Memorial Bursary*

*Field of study*: Chemical and Petroleum Engineering.
*Value*: $500 per year for 2 years.
*Number*: 1—every odd-numbered year.
*Conditions*: Offered to a student entering third year in the Department of Chemical and Petroleum Engineering, with preference in the Chemical field. The award will be made on the basis of academic standing and financial need, and will be renewed for the fourth year subject to satisfactory academic progress and continued financial need.
*Apply*: Administrator of Student Awards by June 15.

*The Board of Governors Scholarship in Engineering*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the Faculty.
*Donor*: The Escheated Estates Fund of The University of Alberta .

*The British America Paint Company Scholarship*

*Value*: $250.
*Conditions*: Offered annually to a student entering second year in the Faculty of Engineering, based on the work of the first year.

*The Cactus Drilling Corp. Ltd. Bursary*

*Field of study*: Geology or Engineering.
*Value*: $500.
*Conditions*: Offered to a student entering final year of the general or honors program in Geology or final year Engineering on a basis of academic standing, financial need and contribution to extracurricular student activities.
*Apply*: Administrator of Student Awards by June 15.

*The Canada Cement Company Scholarships*

*Field of study*: Civil and Mechanical Engineering.
*Value*: $500 each.
*Number*: 2.
*Conditions*: Offered annually to students of outstanding merit, one entering third year Civil Engineering and one entering third year Mechanical Engineering, based on the work of the second year. To qualify, a student must have achieved an average of at least 7.0 on a full second year at The University of Alberta. In the event that no student qualifies for one or other of the above, the award would be made available in the other department as a second award for that year.

*The Canada-Cities Service Petroleum Corporation Bursary*

*Field of study*: Engineering or Honors Geology.
*Value*: $500.
*Conditions*: Offered annually to a student entering the fourth year of one of the above programs who has indicated an interest in the petroleum field. The basis of award will be academic standing and financial need.
*Apply*: Administrator of Student Awards by June 15.

*The Canadian Natural Gas Processing Association Book Prize*

*Value*: A Certificate and a $50 book prize.
*Conditions*: Awarded to a student completing third year and entering fourth year in the Faculty of Engineering.

*The Chemical Institute of Canada Prize in Chemical Engineering*

*Value*: $25 in books.
*Conditions*: Awarded annually to the student in Chemical Engineering who obtains the highest standing in the work of the third year, provided that the student's general record is satisfactory to the Faculty Council.

*The Chevron Standard Scholarship in Engineering*

*Field of study*: Chemical, Mechanical, or Mining Engineering.
*Value*: $500.
*Conditions*: Offered annually to a student of outstanding merit who is entering the final year in one of the above Departments and who is interested in oil exploration or production. Preference will be given to a male Canadian citizen.
*Apply*: Administrator of Student Awards by June 15.

*Cominco Scholarships*

*Field of study*: Honors Chemistry or Geology, Soil Science or Chemical, Mechanical, Mining or Metallurgical Engineering.
*Value*: $800 per year for two years.
*Number*: 2.
*Conditions*: Offered to students of outstanding merit entering the third year of any of the above programs. Renewal for the fourth year is dependent on a satisfactory academic record in the third year.
*Donor*: Cominco Limited, Trail, B.C.
*Apply*: Administrator of Student Awards by June 15.

*The Con-Force Products Ltd. Scholarship*

*Field of study*: Civil Engineering.
*Value*: $400.
*Conditions*: Offered to a student of outstanding merit entering the third year of Civil Engineering, based on the work of the second year at The University of Alberta.

*The A. Cristall Memorial Scholarship*

*Field of study*: Drafting.
*Value*: $100.
*Conditions*: Awarded annually to a student in Drafting 151, provided that the student passes all courses in a full program and with a grade point average of at least 7.0.
*Donor*: Royal George Hotel, Edmonton.

*The Cyanamid of Canada Limited Scholarship*

*Field of study*: Chemical Engineering.
*Value*: $600 plus a $300 grant to the Department.
*Conditions*: Awarded to a student of outstanding merit entering fourth year of the Department of Chemical Engineering.

*The Dow Chemical Scholarship*

*Field of study*: Chemical Engineering.
*Value*: $500 plus a grant of $250 to the Department.
*Conditions*: Offered annually to a student of outstanding merit entering fourth year Chemical Engineering on the basis of his academic record in the third year and his interest in the Chemical Engineering Club and in student affairs generally.
*Donor*: Dow Chemical of Canada, Limited.

*Engineering Institute of Canada Prize*

*Value*: $25.
*Conditions*: Open to a third year student in any of the Departments in the Faculty. To be eligible a student must be a member of and active in, one or more of the various student organizations or clubs related to engineering. The basis of award will be academic standing (average not less than 7.0) and contribution to such organizations.
*Apply*: Selection will be made by a committee set up by the Dean.

*The Gas Company Scholarships*

*Value*: $500 each.
*Number*: 2.
*Conditions*: Offered annually to students entering third year who have shown high academic achievement in the second year.
*Donor*: Northwestern Utilities Limited.

*The Sam J. Gorman Memorial Bursary in Engineering*

*Value*: $300.
*Conditions*: Offered to a student who has completed the second year of Engineering on the basis of academic standing and financial need.
*Donor*: Endowed by the family of the late Samuel J. Gorman.
*Apply*: Administrator of Student Awards by June 15.

*The Albert J. Hrapko Memorial Prize*

*Field of study*: Electronics.
*Value*: $100.
*Conditions*: Offered annually to a student of oustanding merit entering the Electronics pattern of the fourth year in the Department of Electrical Engineering.
*Donor*: Endowed by members of the family in honor of Mr. Hrapko, who graduated from the University of Alberta in 1951 and who died in 1964.

*The Inland Cement Industries Ltd. Scholarship*

*Field of study*: Civil Engineering.
*Value*: $600.
Conditions: Offered annually to a student of outstanding merit entering the fourth year of Civil Engineering. The award is based on the academic standing of a full normal third year which must be not less than 7.0.

*The Douglas Farquhar Johnston Bursaries in Engineering*

*Field of study*: Mining or Metallurgical Engineering.
*Value*: $500 each.
*Number*: 2.
*Conditions*: Offered annually to students entering the fourth year in Mining or Metallurgical Engineering. Awards will be based on academic standing and financial need. If there are no suitable candidates entering fourth year, those entering third year may be considered.
*Donor*: Endowed by the late Mr. Johnston,
*Apply*: Administrator of Student Awards by June 15.

*The John Alexander McDougall Memorial Scholarship*

*Field of study*: Civil Engineering.
*Value*: $500.
*Conditions*: Offered annually to a student of outstanding merit entering the fourth year of Civil Engineering, based on the work of the third year.
*Donor*: McDougall & Secord Limited in memory of John Alexander McDougall, a member of the first senate of the University.

*The Nowsco of Canada, Ltd. Scholarship*

*Value*: $500.
*Conditions*: Awarded to a student of outstanding merit entering the third year of the Faculty.

*The R. C. E. Memorial Scholarship*

*Value*: $125.
*Conditions*: Offered to a student who has completed the third year in Engineering and who is a member in good standing of the Officers' Training Corps (Army) and has had at least one summer's training with such a unit. Award will be made on the basis of academic standing and qualities of

leadership manifested in the activities of the Officers' Training Corps and in student affairs generally.
*Donor*: Royal Canadian Engineer Memorial Trust.
*Apply*: Administrator of Student Awards by May 15.

*The J. M. Sharpe Memorial Prize*

*Field of study*: Electrical Engineering.
*Value*: $100 each.
*Number*: 2.
*Conditions*: One prize to be awarded to a student of outstanding merit in each of the two optional routes of study in the third year of the Department of Electrical Engineering.
*Donor*: Electrical Equipment (Alberta) Ltd.

*The Sherritt Gordon Mines Limited Scholarship*

*Field of study*: Chemical Engineering.
*Value*: $600.
*Conditions*: Awarded annually to a student of outstanding merit entering fourth year Chemical Engineering.

*The Sunwapta Broadcasting Limited Scholarship*

*Field of study*: Communications as related to the Broadcasting and Television Industry.
*Value*: $200.
*Conditions*: Open to students entering fourth year Electrical Engineering or Honors Physics, or entering third or fourth years in Arts who have an interest in journalism or script writing.
*Donor*: Dr. G. R. A. Rice.
*Apply*: Administrator of Student Awards by June 15.

*Underwood McLellan and Associates Limited Scholarship*

*Field of study*: Civil Engineering (Municipal options).
*Value*: $200.
*Conditions*: Awarded annually to a student entering fourth year Civil Engineering, preferably in the Municipal Engineering option, who has achieved an average at least 6.5 on a full third year in the Department.

*Webb Memorial Student Paper Competition*

*Value*: $50, $30 and $20.
*Number*: 3.
*Conditions*: Prizes awarded each year for the three best student papers written and presented to the Engineering Students' Society, at its regular meetings. Eligibility requires membership in the Society and the rules of the competition are set forth in the constitution of that body.
*Donor*: Engineering Students' Society.

*Western Supplies Limited Scholarship*

*Value*: $500 per year for 3 years.
*Conditions*: Offered annually to a student of outstanding merit completing the first year in the Faculty of Engineering whose home is in that portion of Alberta north of and including the City of Red Deer. The award is renewable for the second, third, and fourth years provided that an average of at least 6.5 is achieved in each year's work.

*The John Wilcox Memorial Prize*

*Field of study*: Chemical Engineering.
*Value*: $100.
*Conditions*: Awarded annually to a student of outstanding merit, completing third year of Chemical Engineering. General ability and financial need may be considered.
*Donor*: Endowed by the Petroleum Engineering Class of '53 through Montreal Trust Co., Calgary.

## 223.10 / *School of Household Economics*

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

### *The Warren W. and Ida E. Prevey Memorial Gold Medal in Household Economics*

*Conditions*: Offered to the graduating student with the highest standing in the work of the final two years.
*Donor*: Dr. Esther and Miss Ruth Prevey.

### *The Lorena Barfoot Prize in Household Economics*

*Field of study*: Dietetics.
*Value*: $50.
*Conditions*: Offered annually to a student graduating from the School of Household Economics who is proceeding into a Dietetic Internship.
*Where tenable*: At any approved institution; payable when registered.
*Donor*: Endowed by the late Sarah Lorena Barfoot.

### *The Canadian Dietetic Association Award*

*Field of study*: Dietetics.
*Value*: $200.
*Number*: 1 for Canada-wide competition.
*Conditions*: Offered to a graduating Canadian Household Economics student who is proceeding to a dietetic internship or completing an integrated internship. The student must have stood in the upper quarter of her class during third year, must meet personal qualifications, and indicate an intention to work for at least two years in the dietetic profession.
*Where tenable*: Any approved institution.
*Apply*: Submit applications through the Director of Household Economics to the Canadian Dietetic Association by March 31.

### *The Russell Food Equipment Limited Scholarship*

*Value*: $350.
*Conditions*: Offered annually to a student graduating from the School of Household Economics who is proceeding to an M.Sc. program in Foods, Nutrition or Institution Management, or into a Dietetic Internship. Scholarship is payable when registered.
*Where Tenable*: At any approved university or institution.

### *The Alberta Wheat Pool Scholarships*

*Field of Study*: Household Economics.
*Value*: $200 each.
*Number*: 3.
*Conditions*: One award entering each of first, second and third years of Household Economics. Applicants must have been members of 4-H Homemaking clubs.
*Apply*: Supervisor of 4-H Clubs, Provincial Department of Youth, Edmonton, by August 1.

### *The Board of Governors Scholarship in Household Economics*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the School.
*Donor*: The Escheated Estates Fund of The University of Alberta.

### *The Clothing and Textiles Scholarship*

*Value*: $200.
*Conditions*: Awarded annually to a student of outstanding merit entering the third year of the Clothing and Textile program. The student must have passed all subjects and obtained an average of at least 6.5 on the work of the first two years.
*Donor*: Endowed by an anonymous donor.

### *The Economics Laboratory (Canada) Limited Award*

*Field of Study*: Foods and Nutrition.
*Value*: $500.
*Number*: 1 for Canada-wide competition.
*Conditions*: Offered annually to a student who is entering the final year in the Foods and Nutrition program and who plans to complete dietetic internship and work in the dietetic field. Award is based on scholarship and evidence of potential for, and interest in, the dietetic profession.
*Where Tenable*: Any Canadian School of Household Economics.
*Apply*: Applications should be submitted through the Director of Household Economics to the Canadian Dietetic Association prior to October 16.

### *The Phyllis Osborne McGachie Bursary*

*Value*: $100.
*Conditions*: Offered to a student completing the first or second year in Household Economics, on the basis of academic standing (which must be at least 5.5) and of financial need.
*Donor*: Mrs. Gordon McGachie.
*Apply*: Administrator of Student Awards by June 15.

### *The Hazel McIntyre Prize*

*Value*: $125.
*Conditions*: Offered annually to a student of outstanding merit entering third year in the Foods pattern, based on achievement during the first two years.
*Donor*: Endowed by the Edmonton Home Economics Association.

*The Mabel Patrick Scholarship*

*Value*: $200.
*Conditions*: Offered annually to a student of outstanding merit entering third year, based on the academic record of the first two years (average not less than 6.5).
*Donor*: Endowed by The Alberta Home Economics Association.

*The Gretta Shaw Simpson Memorial Prize*

*Value*: $25.
*Conditions*: Awarded to the student who achieves the second highest standing in the work of the second year, provided that all courses are passed and an average of 6.5 is achieved.
*Donor*: Miss Maimie S. Simpson in memory of her sister, formerly instructor in Bacteriology at the University.

*The Annie Gertrude Tory Scholarship*

*Value*: $100.
*Conditions*: Offered annually to the student who achieves the highest standing in the work of the second year, provided that all courses are passed and an average of at least 6.5 is obtained.
*Donor*: Endowed by the late Henry Marshall Tory, first President of the University, in memory of his wife.

## 223.11 / *Faculty of Law*

### 223.11.1 / UNDERGRADUATE AWARDS

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Horace Harvey Gold Medal in Law*

*Conditions*: Awarded to a graduating student for the highest standing in the work prescribed for the LL.B. degree, provided that the student obtains an average of not less than 7.0.
*Donor*: Endowed by the late Chief Justice of Alberta.

*The George Bligh O'Connor Silver Medal in Law*

*Conditions*: Offered to a graduating student for the second highest standing in the work prescribed for the LL.B. degree, provided that the student obtains an average of not less than 7.0.
*Donor*: Mrs. G. G. Farnell, in memory of her father, formerly Chief Justice of Alberta.

*The Honorable Clinton J. Ford Shields*

*Number*: 2.
*Conditions*: Awarded to each of the two third-year students who make the best argument in the finals of the annual Moot Court Competition. In addition the names of each year's winners will be recorded on a permanent plaque, a gift of the late Chief Justice.
The four finalists are selected from those students who have presented the best arguments in the second-year Moot program. The four will compete in two teams, the winning team to receive the shields.
*Donor*: The late Chief Justice of Alberta.

*The Raymond James Memorial Prize*

*Field of Study*: Equity.
*Value*: $50.
*Conditions*: Awarded to a student in the final year of Law for outstanding merit in the subject of Equity.
*Donor*: Endowed by Mrs. E. L. FitzSimon, LL.B. (1926), in memory of her brother.

*The National Trust Prize*

*Value*: $150 in books.
*Conditions*: Offered to a student of the graduating class in Law for outstanding merit in examinations in Equity 1, Equity 2, Real Property 2, Real Property 3, and Wills and Administration, provided that an average of at least 7.0 is attained on the complete second and third years.

*The Morris and Naomi Shoctor Memorial Prize*

*Value*: $50.
*Conditions*: Awarded to a student who has completed third year Law, has maintained a satisfactory academic record and has made a significant contribution to student life at the University.
*Donor*: Mr. Joseph H. Shoctor, Q.C.

*The Ernest Brown Wilson Memorial Prize*

*Value*: $100.
*Conditions*: Awarded annually to a student in the graduating class in Law for outstanding merit in the work prescribed for the final year of the LL.B. degree.
*Donor*: Endowed for 20 years, beginning in 1962, by Mrs. Wilson, through the Royal Trust Company.

*The Board of Governors Scholarship in Law*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the Faculty.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*The Canada Law Book Company Prizes*

*Value*: $50 in books each.
*Number*: 3.
*Conditions*: Awarded to a student completing each of first, second and third years of Law. The books are to be selected from a list submitted by the donor, the selection to be made within six months.

*The Canada Permanent Trust Company Prize*

*Value*: $100.
*Conditions*: Offered annually for outstanding merit in the subject of Wills, provided that the student's general record is satisfactory to the Faculty Council.

*The Carswell Prizes in Law*

*Value*: $30 in books each.
*Number*: 3.
*Conditions*: Awarded to a student completing each of the first, second, and third years. Books shall be selected within six months of the date of the award from a list submitted by the company.
*Donor*: Carswell Company, Limited, Law Publishers.

*The Edmonton Bar Association Prize*

*Value*: $100 and a trophy.
*Conditions*: Awarded annually to the student in first year Law judged to have given the best performance in the Moot Court Competition for first year Law.

*The Edmonton Lodge of B'nai B'rith Prize*

*Value*: $50.
*Conditions*: Offered to such student in the second year of Law as may be selected by the Faculty.

*The William Gordon Egbert Prize in Administrative Law*

*Value*: $50.
*Conditions*: Awarded annually for outstanding merit in Administrative Law.
*Donor*: Mr. W. G. N. Egbert, Esq., Calgary.

*The Insurance Company of North America—H. C. Mills Memorial Award*

*Field of Study*: Insurance Law.
*Value*: $250.
*Conditions*: Awarded to the student who obtains the highest standing in Insurance Law.

*The Law Wives Club of Calgary Prize*

*Value*: $100.
*Conditions*: Awarded to a student, whose residence is in Calgary, for outstanding merit in the work prescribed for first year Law.

*The Macleod, Dixon and Company Scholarship*

*Value*: Tuition and fees.
*Conditions*: Offered annually to a student of outstanding merit entering the third year of the Faculty of Law.

*The Abe W. Miller Memorial Prize in Criminal Law*

*Value*: $100.
*Conditions*: Awarded annually to a student completing first year Law for outstanding performance in the subject of Criminal Law.
*Donor*: The law partners of the late Abe W. Miller, Q.C.

*The President's Scholarships*

*Field of Study*: Arts, Science and Law.
*Value*: $450 each.
*Number*: 3.
*Conditions*: Awarded for outstanding academic merit, with no award to be made with an average of less than 7.5. Preferably the awards will be given, one in the Faculty of Arts, one in Science and one in Law.
*Donor*: Endowed in 1943 by the late Mr. Justice H. H. Parlee.

*The Second Counsel Club Prize*

*Value*: $100.
*Conditions*: Offered annually to the woman student with the highest standing in the work of the first year, provided that her work is of outstanding merit. In the event that no woman is eligible, the Prize shall go to the male student with the second highest average in the work of the first year, provided that his work is of outstanding merit.

*The Sydney B. Woods Memorial Prize in Constitutional Law*

*Value*: $50.
*Conditions*: Awarded annually for outstanding merit in the subjects of constitutional law.
*Donor*: The law partners of the late Sydney B. Woods, K.C.

### 223.11.2 / GRADUATE AWARDS IN LAW

NOTE: For other general graduate awards refer to the Graduate Studies section of the Awards Calendar.

*The Carswell-Sweet and Maxwell Scholarship in Law*—From 1960 a scholarship will be offered to be open to all final year and postgraduate law students in Canada, and which will be tenable for one year at Cambridge University.

The student will be required to do post-graduate work in Anglo-Canadian Law. The value of the scholarship will be $2,000.00 and the cost of travel to Great Britain and return will be paid in addition. Application forms may be obtained from the Dean of the Faculty of Law.

*The Viscount Bennett Trust Fund Scholarship*—Under the terms of a deed of gift to the Canadian Bar Association from the late Right Honorable Viscount Bennett, P.C., K.C., LL.D., D.C.L., Honorary Life President of the Association, a trust fund known as the Viscount Bennett Trust Fund has been established. The annual income from the fund or the sum of $2,000, whichever is the less, will be paid annually as a scholarship for postgraduate study of law at an approved graduate school.

The scholarship is open to final year and graduate students of approved Canadian law schools, of which the Faculty of Law of The University of Alberta is one.

Applications for this scholarship should be received by the Dean of the Faculty of Law before Dec. 31.

*The Viscount Bennett (Law Society of Alberta) Graduate Scholarship* of $2,500 is made available from a Trust founded by the late Viscount Bennett. It is offered to graduates of the Faculty of Law, The University of Alberta, for post-graduate study in Law at The University of Alberta or at another recognized institution. Applicants should state an intent to return to Alberta following such study.

Apply to the Dean, Faculty of Law, by February 1.

## 223.12 / *School of Library Science*

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Gold Medal in Library Science*

*Conditions*: Awarded to a student graduating from the School of Library Science. The award will be made on a basis of academic standing and promise of professional competence.
*Donor*: Anonymous.

*The Board of Governors Scholarship in Library Science*

*Value*: Tuition and fees for one year.
*Conditions*: Open to a student of outstanding merit entering the School of Library Science.
*Donor*: The Escheated Estates Fund of The University of Alberta.
*Apply*: Selection will be made by the School.

*The A.P.L.U.A. Book Prize*

*Value*: $50 in books.
*Conditions*: To be awarded to the student making the best record in L.Sci. 421, Academic Libraries, provided the student secures a standing otherwise satisfactory to the Council of the School.
*Donor*: The Association of Professional Librarians of The University of Alberta.

*Other Awards in Library Science*

There are a number of other scholarships and awards for students about to enter Library Science. They are offered by various national and provincial agencies. Complete information may be obtained from the Canadian Library Association, 63 Sparks Street, Ottawa 4, Ontario.

## 223.13 / *Faculty of Medicine*

### 223.13.1 / GENERAL AWARDS

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Moshier Memorial Gold Medal*

*Conditions*: Awarded to a graduating student for outstanding merit in all studies in the Faculty of Medicine, provided that an average of 7.0 or better is attained.
*Donor*: Endowed by the Volunteer Overseas Medical Officers' Association of Edmonton in memory of the late Lt. Col. H. H. Moshier, M.B.

*The John W. Scott Honor Award*

*Value*: Medal and a cash prize of $250.
*Conditions*: Offered to a student completing the final year of the M.D. program who, over the four years of the program, has shown himself to possess to an outstanding degree those qualities of scholarship, leadership, and character which may be expected to lead to a distinguished position in the medical profession. The recipient will be selected by a committee on which faculty, students and alumni will be represented. The award may be made to more than one student in any one year and may be withheld in the event that no sufficiently deserving candidate is available.
*Donor*: Medical Alumni Association of The University of Alberta.

*The Alberta Tuberculosis Association Prize*

*Value*: $100 and a one-year subscription to the American Review of Respiratory Diseases.
*Conditions*: Offered annually to a third or fourth year medical student for the most satisfactory essay on some phase of thoracic disease.
*Apply*: Essays must be submitted in duplicate to the Administrator of Student Awards by March 1.

*The Board of Governors Scholarship in Medicine*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the Faculty.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*The Mrs. J. W. S. Chappelle Memorial Bursary*

*Value*: $200.
*Conditions*: Offered annually to a student entering second year Faculty of Medicine on a basis of academic standing and financial need.
*Donor*: The family of the late Mrs. Chappelle.
*Apply*: Administrator of Student Awards by June 15.

*The Dr. Allan Coates Rankin Award*

*Value*: $100.
*Conditions*: Awarded annually to the most deserving and outstanding student completing any year of the Faculty of Medicine, on a basis of academic standing and financial need.
*Donor*: Endowed by the late Dean Rankin.

*The Scholarships of the College of Physicians and Surgeons of Alberta*

*Value*: $200 each.
*Number*: 6.
*Conditions*: (1) One scholarship shall be awarded to that student in each of the first three years of Medicine who attains the highest average mark in his class. (2) One scholarship shall be awarded to that student in each of the first three years of Medicine who attains the second highest average mark in his class.

*The Vessie Heckbert Memorial*

*Field of Study*: Cancer research.
*Value*: $2,500.
*Conditions*: Offered annually to either an undergraduate or a graduate of the Faculty of Medicine for one year of research in the field of cancer treatment. In the event that no suitable person is available in any one year, the award may be made to two senior medical students as research workers during the summer, in the amounts of $1,000 each plus $250 each for research materials.
*Donor*: Mr. S. Carl Heckbert of Vermilion, Alberta.
*Apply*: The Dean of Medicine by March 1.

*The Dr. D. S. Macnab Bursary*

*Value*: $250.
*Conditions*: Open to students at the end of first, second or third year in the Faculty of Medicine, on a basis of academic standing and financial need.
*Donor*: Calgary Associate Clinic.
*Apply*: Administrator of Student Awards by June 15.

*The Kenneth William Moodie Bursary*

*Value*: $200.
*Conditions*: Offered annually to a student entering the first year of the Faculty of Medicine or the third year of the B.Sc. program in the Faculty of Science, on a basis of academic attainment in the previous year's work and financial need.
*Donor*: Endowed by the late Miss Marion E. Moodie in memory of her nephew, Flying Officer K. W. Moodie, a graduate of this University who lost his life in 1942, while on operations.

*Apply*: Administrator of Student Awards by June 15.

*The C. V. Mosby Book Awards*

*Value*: $30 in books each.
*Number*: 5.
*Conditions*: Awarded annually to five students of outstanding merit in the Faculty of Medicine.
*Donor*: C. V. Mosby Company.

*The New York Life Medical Scholarship*

*Value*: Tuition and fees, room and board, books and equipment for 4 years.
*Conditions*: Awarded annually to a student entering first year of the Faculty of Medicine, on a basis of academic standing and financial need. The award will be renewable for three further years subject to satisfactory academic standing in each year. Applicants must be citizens of Canada or the United States.
*Donor*: The New York Life Insurance Company.
*Apply*: First year entrants will be notified how to apply.

*The H. E. Rawlinson Medical Book Awards*

*Number*: 2.
*Conditions*: Offered annually to two graduating students from the Faculty of Medicine for general excellence. Each award consists of the student's choice from the list of publications of the donor.
*Donor*: Lange Medical Publications of California.

*The Research Fellowship of the College of Physicians and Surgeons of Alberta*

*Value*: $1,800, plus fees for the succeeding year in the Faculty of Medicine.
*Conditions*:
(1) It shall be granted at the completion of the first or second year in Medicine, tenable for one year and renewable for a further period.
(2) The research shall be carried out in one of the basic sciences.
(3) It shall only be granted when in the opinion of the Medical Faculty they have a student who from the standpoint of ability and aptitude is worthy of this scholarship.
(4) From time to time the Council shall be advised of the nature of the work being carried out and its progress.

In the event that no suitable person is available in any one year the award may be made to two senior medical students as two undergraduate medical research summer scholarships in the amount of $1,000 each.
*Apply*: The Dean of Medicine by March 1.

*The Dorothy Jean Usher Memorial Research Award*

*Value*: $1,000.
*Conditions*: Available to a student completing third year Faculty of Medicine for support in a summer research project in medicine, with preference to the study of leukaemia.
*Donor*: Endowed by Mr. and Mrs. Thos. Usher of Scollard, Alberta.
*Apply*: Dean of Medicine by March 1.

## 223.13.2 / BACTERIOLOGY

*The Allan Coates Rankin Prize in Bacteriology*

*Value*: $75.
*Conditions*: Awarded to the medical student who obtains the highest mark in Bacteriology 421, provided that he has obtained at least a grade of 7 in this course, and that he has taken, and passed, all of the subjects of that year.
*Donor*: Rankin Medical Journal Reporting Club.

## 223.13.3 / BIOCHEMISTRY

*The Society of Chemical Industry Merit Awards*

*Field of Study*: Biochemistry, Chemistry and Chemical Engineering.
*Value*: A gold key, and a year's subscription to "Chemistry and Industry".
*Number*: 3.
*Conditions*: Awards will be made to the student graduating with the highest standing in each of Honors Biochemistry, Honors Chemistry and Chemical Engineering provided an average of 7.0 is attained in the final year, and that the program has been completed in the normal number of years.

*The Hugh and Mabel McAfee Memorial Scholarship*

*Value*: $250.
*Conditions*: Offered annually to a student of outstanding merit in Biochemistry in the first year of Medicine, provided the student's record is otherwise satisfactory.
*Donor*: Endowed by Mrs. L. B. Pett, of Ottawa, in memory of her parents.

## 223.13.4 / MEDICINE

*The E. L. Pope Memorial Award in Medicine*

*Value*: $75 and a scroll.
*Conditions*: Offered annually to a graduating student for outstanding merit in Medicine, provided that the average in the courses in Medicine is 7.0 or more.
*Donor*: Edmonton Academy of Medicine.

*The Percy H. Sprague Prize in Medicine*

*Value*: $75 and a scroll.
*Conditions*: Offered annually to a third year student for outstanding merit in Internal Medicine.
*Donor*: Alberta Society of Specialists in Internal Medicine.

## 223.13.5 / OBSTETRICS AND GYNAECOLOGY

*The Conn Memorial Gold Medal in Obstetrics and Gynaecology*

*Conditions*: Offered annually to a graduating student for outstanding merit in Obstetrics and Gynaecology, provided that the grade point average of the student in the courses in these subjects is 7.0 or better.
*Donor*: Endowed by Mr. Geoffrey H. Wood.

## 223.13.6 / OPHTHALMOLOGY

*The Dr. Ernest A. Johnson Scholarship in Ophthalmology*

*Value*: $100.
*Conditions*: Awarded annually to a student of outstanding merit graduating from the Faculty of Medicine based on results of the examinations in Ophthalmology in the third or fourth years.
*Donor*: Endowed by Dr. Ernest A. Johnson of Calgary.

## 223.13.7 / PAEDIATRICS

*The Douglas Leitch Gold Medal in Paediatrics*

*Conditions*: Awarded annually to a graduating student in the Faculty of Medicine for outstanding merit in Paediatrics.
*Donor*: Endowed by the Alberta Paediatric Society.

## 223.13.8 / PATHOLOGY

*The John James Ower Gold Medal in Pathology*

*Conditions*: Awarded annually to a graduating student for outstanding merit in Pathology, provided that an average of at least 7.0 has been obtained in the courses in Pathology.
*Donor*: Endowed by the Medical Alumni and friends and colleagues of the late Dr. Ower, through the Alumni Association.

*The John James Ower Memorial Scholarship in Pathology*

*Value*: $250.
*Conditions*: Awarded annually to a student completing the third year of the Faculty of Medicine for outstanding merit in Pathology. Eligibility depends upon a grade of at least 7 in the course in Pathology in each of the second and third years.
*Donor*: Endowed by the Medical Alumni and friends and colleagues of the late Dr. Ower, through the Alumni Association.

*The Isaac and Leah Weinlos Prize in Pathology*

*Value*: $50.
*Conditions*: Awarded annually to a student in third year for outstanding merit in Pathology.
*Donor*: Endowed by Dr. and Mrs. Morris Weinlos and daughters.

## 223.13.9 / PHARMACOLOGY

*The Nathan Browne Eddy Prize in Pharmacology*

*Value*: An instrument useful in medical practice or books, to the value of about $40.
*Conditions*: Offered to a student who has successfully completed the second year with an average of at least 7.0 and has shown outstanding merit in Pharmacology.
*Donor*: Hoffmann-La Roche Limited.

## 223.13.10 / PHYSIOLOGY

*The A. W. Downs Prize in Physiology*

*Value*: An instrument useful in medical practice of a value of about $50.
*Conditions*: Awarded annually to the medical student who obtains the highest marks in the course in Physiology in the first year provided that he has obtained a grade of 7 or better and has passed all subjects.
*Donor*: Endowed by Dr. W. J. Downs and the Medical Alumni Association.

## 223.13.11 / PSYCHIATRY

*The Dr. S. S. Spaner Prize in Psychiatry*

*Value*: $50.
*Conditions*: Awarded annually to a fourth year student for outstanding merit in Psychiatry provided his record is otherwise satisfactory.
*Donor*: Endowed by Mr. F. J. Cameron of Calgary.

## 223.13.12 / SURGERY

*The Mewburn Memorial Gold Medal in Surgery*

*Conditions*: Offered annually to a graduating student for outstanding merit in Surgery, provided that the grade point average in such courses is 7.0 or better.
*Donor*: Medical Undergraduate Society.

*The Surgical Research Prize*

*Value*: $50.
*Conditions*: Awarded to a third or fourth year student for the best manuscript submitted on an original Surgical Research topic. For details regarding the manuscript, applicants may contact the members of the Department of Surgery.
*Apply*: Manuscripts must be submitted to the Dean of Medicine by March 31. They should be typed, double spaced, not exceeding 25 pages and accompanied by any references or bibliography.

*The Isaac and Leah Weinlos Scholarship in Surgery*

*Value*: $200.
*Conditions*: Awarded annually to the student with the highest combined standing in third and fourth years Surgery provided that the student's record is otherwise satisfactory.
*Donor*: Endowed by Dr. and Mrs. Morris Weinlos and daughters.

## 223.13.13 / MEDICAL LABORATORY SCIENCE

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Alberta Hospital Association Gold Medal and Prize*

*Value*: Gold Medal and $25.
*Conditions*: Awarded to the student graduating with the highest distinction from the B.Sc. program in Medical Laboratory Science.

*The Alberta Hospital Association Prize in M.L.S.*

*Value*: $50.
*Conditions*: Offered annually to a student of outstanding merit completing the third year of the M.L.S. program.

*The Alberta Society of Pathologists Prize in M.L.S.*

*Value*: $25.
*Conditions*: Offered annually to a student of outstanding merit completing the second year of the Medical Laboratory Science program.

*The Ortho Diagnostics Prize*

*Value*: A certificate and $50.
*Conditions*: Awarded to the student with the highest standing in Haemotology and Immunohaemotology in the third year of the Medical Laboratory Science program, provided that the student's record is otherwise satisfactory.
*Donor*: Ortho Diagnostics, Don Mills, Ontario.

## 223.13.14 / GRADUATE AWARDS IN MEDICINE

(For other general graduate awards refer to § 224 of the Awards Calendar or the Graduate Studies Calendar).

*The Medical Research Council Awards.* Awards of $3,600 or $3,000 are provided by the Council for students who have a B.Sc. and are proceeding to an M.Sc. or Ph.D. program in a basic medical science under the supervision of a department in a Faculty of Medicine.

Application should be made direct to Administrative Officer, Personnel Support Programs, Medical Research Council, Montreal Road, Ottawa 7, Ontario. Closing application dates are January 1 for the March competition and April 1 for the June competition.

For further information inquire of the Student Awards Office or the office of the Dean of Medicine.

*The Percy Hermant Fellowships in Ophthalmology.* Two awards of $1,000 each wil be offered annually by Imperial Optical Company to medical graduates of a Canadian university for further study in Ophthalmology at The University of Alberta, or at another approved institution. Applicants must indicate an intention to subsequently practise this specialty in Canada.

Apply to Head, Division of Ophthalmology, Department of Surgery, The University of Alberta, by March 1.

*The University of Alberta Eye Research Fellowship* of $5,000 per annum is offered to a medical doctor for post-graduate research under the auspices of the Retina Foundation—Institute of Biological and Medical Sciences in Boston, Massachusetts. A recipient may apply for renewal for a second or third year of work at the Retina Foundation. Applicants must be Canadian citizens and state an intention to return to Canada to practise.

Apply to Administrator of Student Awards, The University of Alberta, Edmonton, by April 1 for the year beginning July 1.

## 223.14 / *School of Nursing*

### 223.14.1 / UNDERGRADUATE AWARDS

NOTE: Gold Medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Gold Medal in Nursing*

*Conditions*: Awarded annually to the student graduating from the regular program for the Bachelor of Science in Nursing who has shown the highest degree of academic attainment and proficiency.
*Donor*: The Director of the School.

*The Board of Governors Scholarship in Nursing*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the School.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*The Helen MacArthur Prize in Nursing*

*Value*: $150.
*Conditions*: Offered to a student of outstanding academic merit completing the second year of the B.Sc. program in Nursing.
*Donor*: The Friends of the University.

### 223.14.2 / GRADUATE AWARDS IN NURSING

NOTE: For other general graduate awards refer to the Graduate Studies section of the Awards Calendar.

*Professional Training Grants*: Financial assistance is available to graduate nurses pursuing post-graduate study in any field of nursing. Application should be made to the Deputy Minister of Health, Department of Public Health, Administration Building, Edmonton, Alberta.

*The University of Alberta Hospital School of Nursing Alumnae Association Scholarship*: Financial assistance is available to graduates of the School to undertake post-graduate work in any field of nursing. Applications should be addressed to the Secretary of the Alumnae Association, c/o Office of Director of Nursing, University of Alberta Hospital.

## 223.15 / *Faculty of Pharmacy*

### 223.15.1 / UNDERGRADUATE AWARDS

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Alberta Pharmaceutical Association Medals*

*Value*: One gold medal plus full cost of registration in the Association.
*Conditions*: The gold medal is offered to a graduating student for outstanding merit in all subjects of the fourth year provided that a grade of at least 5 is attained in each subject, with an average of at least 7.0.

*The Alberta Pharmaceutical Association Awards*

*Value*: As below.
*Number*: 4.
*Conditions*: Offered as follows:
(1) $100 scholarship for outstanding merit in the subjects of the first year, provided that a grade of 5 or better is obtained in each.
(2) $100 scholarship on similar terms for the second year.
(3) A five-year subscription to The Practical Pharmacy Edition of the Journal of The American Pharmaceutical Association for outstanding merit in the second year dispensing course.
(4) The cost of registration with the Alberta Pharmaceutical Association for the student preparing the best thesis in the Pharmacy 449 (Pharmaceutical Research) laboratory course provided that the student's record is otherwise acceptable.

*The Board of Governors Scholarship in Pharmacy*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the Faculty.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*The Burroughs Wellcome Bursary*

*Value*: $250.
*Conditions*: Offered to a student entering second or third year who has demonstrated outstanding ability in the field of Pharmacy. Financial need will be considered in making the award.
*Donor*: Burroughs Wellcome and Company (Canada) Limited.

*The Calgary Ladies Pharmaceutical Auxiliary Prize*

*Value*: Usually not less than $100.
*Conditions*: Offered annually to a woman

student of outstanding merit in the pharmacy courses of the first year provided that her average in these courses is at least 7.0 and that her record is otherwise satisfactory. In the event that no woman qualifies, the award may be made to a man.

*The Canadian Foundation for the Advancement of Pharmacy Scholarships*

*Value*: $100 each.
*Number*: Variable.
*Conditions*: At least one to be available to a student completing first year and one to students completing second year.
Minimum requirements are an average of 7.0 on the year's work, provided that the standing in the practical work in Pharmacy does not fall below 7.0. Financial need will be considered in making the award.

*The Charles Cummer Memorial Prize*

*Value*: $100.
*Conditions*: Offered to a student of outstanding merit entering the second or third year of the Faculty. Financial need will be considered in making the award.
*Donor*: Endowed by the late Mrs. Sarah A. Cummer of Edmonton.

*The Drug Travellers of Alberta Bursary*

*Value*: $300.
*Conditions*: Offered to a student of outstanding merit who has completed at least one academic year in the Faculty of Pharmacy. The basis of award will be academic standing, financial need, qualities of leadership and aptitude in the field of Pharmacy.
*Donor*: Alberta Range Riders, Calgary, and the Northern Ambassadors, Edmonton, (drug travelling fraternities).

*The Edmonton and District Ladies' Pharmaceutical Auxiliary Prize*

*Value*: $100.
*Conditions*: Offered annually to a student of outstanding merit entering the third or fourth year of the Faculty of Pharmacy.

*The Film Services (Alberta) Limited Scholarship*

*Value*: $500.
*Conditions*: Offered annually to a student of outstanding merit entering fourth year Pharmacy preferably in the Pharmacy Administration program.

*The Charles E. Frosst Scholarship*

*Value*: $250.
*Conditions*: Offered annually to a student of outstanding merit entering the final year of the Faculty of Pharmacy.
*Donor*: Charles E. Frosst and Company, Montreal.

*The Hoffman-LaRoche Canadian Centennial Scholarship*

*Value*: $500.
*Conditions*: Offered annually to a student of outstanding merit entering second, third or fourth year of the Faculty of Pharmacy.
*Donor*: Hoffman-LaRoche Limited.

*The Merck, Sharp and Dohme Awards*

*Value*: $25 cash and certain pharmaceutical manuals.
*Number*: 2.
*Conditions*: Offered to two students in first year Pharmacy who attain the highest standing in Chemistry 230 and Chemistry 250 respectively.
*Donor*: Merck, Sharp and Dohme of Canada, Limited.

*The Shipley Scholarship*

*Value*: $250.
*Conditions*: Offered to a student completing the second year for outstanding merit in the course in Dispensing Pharmacy.
*Donor*: Shipley Photo Services, Limited, of Calgary and Edmonton.

*The Southern Alberta Pharmacy Bursary*

*Value*: $250.
*Conditions*: Offered annually to a student of outstanding merit completing the first year of Pharmacy, who has taken the majority of his high school training in Alberta, south of, and not including, Calgary. Financial need will be considered in making the award.
*Donor*: South of Calgary Pharmacists and the Highwaymen (Southern Alberta Drug Travellers).

*The Upjohn Company of Canada Scholarship*

*Value*: $200.
*Conditions*: Offered annually to a student of outstanding merit entering fourth year Pharmacy.

*The M. J. Warner Memorial Scholarship*

*Value*: $100.
*Conditions*: Offered for outstanding merit in the Pharmacy courses of the first and second years provided that grades of not less than 6 are obtained in these courses, with an average of at least 7.0.
*Donor*: The Alberta Pharmaceutical Association.

## 223.15.2 / GRADUATE AWARDS IN PHARMACY

(For other general graduate awards refer to § 224 of the Awards Calendar or the Graduate Studies Calendar).

*The Pfizer Research Scholarship* of the value of $300 is offered annually to an outstanding Pharmacy graduate of The University of Alberta who is undertaking

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graduate work in the Faculty, preferably in hospital pharmacy or biopharmacy.

Selection will be made by the Faculty.

*The Warner-Lambert Graduate Fellowship* of the value of $1,200 if offered annually to a student of outstanding merit undertaking graduate work in Pharmacy at The University of Alberta. A supplementary grant of $300 for equipment and supplies will also be made to the Faculty of Pharmacy.

Selection will be made by the Faculty.

*Medical Research Council Awards in Pharmacy*. Scholarships are available from the Council for graduate study in Pharmacy. For information inquire of the Dean of the Faculty or the Medical Research Council, Montreal Road, Ottawa 7, Ontario.

## 223.16 / *Faculty of Physical Education*

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Alumni Gold Medal in Physical Education*

*Conditions*: Offered to the oustanding graduating student in Physical Education, provided that the student has been registered in a full year's program and has obtained an average of at least 7.0 in the final year.
*Donor*: The Alumni Association of The University of Alberta.

*The Alberta Command, Royal Canadian Legion Bursaries in Physical Education*

*Value*: $300 and $200.
*Number*: 2.
*Conditions*: Offered to students entering third year of the Faculty on a basis of academic standing and financial need.
*Apply*: Administrator of Student Awards by June 15.

*The Atomic Transfer Ltd. Bursary*

*Value*: $200.
*Conditions*: Offered annually to a student completing first year on a basis of academic standing and financial need.
*Donor*: Atomic Transfer Ltd. of Winnipeg.

*The Board of Governors Scholarship in Physical Education*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the Faculty.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*The J. K. Campbell and Associates Limited Scholarship*

*Value*: $200.
*Conditions*: Awarded annually to a student of outstanding academic merit completing the second year of the Faculty.

*The Edmonton Men's Branch of the Canadian Association for Health, Physical Education and Recreation Bursaries*

*Value*: $100 each.
*Number*: 4.
*Conditions*: Three offered to students entering second or third year of the B.P.E. program (not more than one of whom may be a woman) and one offered to a man or woman entering second, third or fourth year of the B.A. in Recreation Administration program. All awards are based on academic standing (average not less than 5.5), finan-

cial need, and contribution in the field of Physical Education or Recreation.

*The Edmonton Women's Branch of the Canadian Association for Health, Physical Education and Recreation Book Prizes*

*Value*: $50 in books each.
*Number*: 2.
*Conditions*: Offered to two women students of outstanding merit, one completing the first year and one completing the second year of the Bachelor of Physical Education program.

*Fruehauf Trailer Company of Canada Limited Bursaries*

*Value*: Variable.
*Number*: Variable.
*Conditions*: In most years the donor provides a sum of money to be used for bursaries in the Faculty of Physical Education.

*Recreation Scholarships and Bursaries*

Value: $100 to $500.
*Conditions*: See under Province of Alberta Assistance.

## 223.17 / *School of Rehabilitation Medicine*

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Occupational Therapy Book Prize*

*Value*: Books.
*Conditions*: Offered annually to the student obtaining the highest standing in the final year of the diploma program in Occupational Therapy, providing that his or her record is otherwise satisfactory.
*Donor*: The Alberta Society of Occupational Therapists.

*The Physiotherapy Book Prize*

*Value*: Books.
*Conditions*: Offered for the highest standing in the final year of the diploma course in Physical Therapy, provided that his or her record is otherwise satisfactory.
*Donor*: The Canadian Physiotherapy Association.

*The Calgary Branch Canadian Physiotherapy Association Book Prize*

*Value*: Books.
*Conditions*: Awarded to an outstanding student graduating with the Diploma in Physical Therapy, on a basis of academic standing, practical work, and personality.

*The Madeline Pierson Memorial Book Prize in Occupational Therapy*

*Value*: Books.
*Conditions*: Offered annually to the student of the final year of the Diploma program who obtains the highest mark in Psychiatry, providing that his or her record is otherwise satisfactory.
*Donor*: The Calgary Branch of the Alberta Society of Occupational Therapists.

*The Board of Governors Scholarship in Rehabilitation Medicine*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the School.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*The Canadian Arthritis and Rheumatism Society (Alberta Division) Bursary*

*Value*: $1000.
*Conditions*: Offered annually to a student entering third year of the School of Rehabilitation Medicine, based on academic standing and financial need.
*Apply*: Administrator of Student Awards by June 15.

*The Canadian Arthritis and Rheumatism Society (Alberta Division) Prize*

*Value*: $50.
*Conditions*: Offered annually to a student entering second or third year of the School of Rehabilitation Medicine showing an outstanding aptitude in some phase of training in Physiotherapy.

*The Canadian Arthritis and Rheumatism Society (B.C. Division) Prize*

*Value*: $50.
*Conditions*: Awarded annually to a student of outstanding merit completing the second year of the School of Rehabilitation Medicine.

*The Canadian Foundation for Poliomyelitis and Rehabilitation (Alberta Chapter) Bursaries*

*Field of Study*: Rehabilitation Medicine.
*Value*: $350 each.
*Number*: 3.
*Conditions*: Awarded annually to applicants entering the first, second and third year of Rehabilitation Medicine. The basis of the award will be academic standing and financial need.
It is expected that recipients will carry on their profession in Alberta for a reasonable period after graduation.
*Donor*: The Royal Canadian Legion.
*Apply*: Administrator of Student Awards—undergraduates by June 15 or matriculants by August 1.

## 223.18 / *Faculty of Science*

### 223.18.1 / INTRODUCTORY NOTE

Awards in specific courses offered by the Faculty of Science are open to any student taking the course, regardless of faculty. See §§ 223.18.3 and following.

### 223.18.2 / GENERAL AWARDS

NOTE: Gold medals and awards to graduating students are listed first. All other awards are listed alphabetically.

*The Lieutenant-Governor's Gold Medal*

*Conditions*: Awarded to the graduating student from an honors program in the Faculty of Science who has shown the highest distinction in scholarship.
*Donor*: His Honor the Lieutenant-Governor.

*The Dean's Gold Medal in Science*

*Conditions*: Awarded to the graduating student from the general program in the Faculty of Science who has shown the highest distinction in scholarship.
*Donor*: The Dean of Science.

*The Aluminum Company of Canada Limited Scholarship*

*Field of Study*: Chemical, Mechanical, Electrical, or Metallurgical Engineering or Honors Chemistry, Physics or Mathematics.
*Value*: $500 plus a grant of $300 to the University.
*Conditions*: The award is based on academic standing, financial need, and general character of the applicant.
*Apply*: Administrator of Student Awards by June 15.

*The Board of Governors Scholarship in Science*

*Value*: Tuition and fees for the succeeding year.
*Conditions*: Awarded to a student of outstanding academic merit at the end of the first year of the Faculty.
*Donor*: The Escheated Estates Fund of The University of Alberta.

*Cominco Scholarships*

*Field of Study*: Honors Chemistry or Geology, Soil Science or Chemical, Mechanical, Mining or Metallurgical Engineering.
*Value*: $800 per year for two years.
*Number*: 2.
*Conditions*: Offered to students of outstanding merit entering the third year of any of the above programs. Renewal for the fourth year is dependent on a satisfactory academic record in the third year.
*Donor*: Cominco Limited, Trail, B.C.
*Apply*: Administrator of Student Awards by June 15.

*The Edmonton Lodge of B'nai B'rith Scholarship*

*Value*: $100.
*Conditions*: Awarded annually to a student of outstanding merit completing the second year of an honors program. The record in the first year may also be taken into account.

*The Hamilton Watch Company Award*

*Value*: An engraved watch and certificate.
*Conditions*: Offered annually to a student of outstanding merit graduating from an Honors Science program. The achievements of the student in Social Science or Humanities courses will be given special consideration.

*The James McCrie Douglas Memorial Scholarship*

*Value*: $450.
*Conditions*: Awarded annually to a student of outstanding merit entering fourth year of an honors program.
*Donor*: Endowed by the late James McCrie Douglas of Edmonton.

*The Kenneth William Moody Bursary*

*Field of Study*: Medicine or Science.
*Value*: $200.
*Conditions*: Open to a student entering first year Medicine or third year B.Sc. Science on the basis of academic standing and financial need.
*Donor*: Bequest of the late Miss Marion E. Moodie in memory of her nephew, Flying Officer Kenneth W. Moodie, killed on active duty, 1942.
*Apply*: Administrator of Student Awards by June 15.

*The President's Scholarships*

*Field of Study*: Arts, Science and Law
*Value*: $450 each.
*Number*: 3.
*Conditions*: Awarded for outstanding academic merit, with no award to be made with an average less than 7.5. Preferably the awards will be given, one in the Faculty of Arts, one in Science and one in Law.
*Donor*: Endowed in 1943 by the late Mr. Justice H. H. Parlee.

*The Renkenberger Scholarship*

*Field of Study*: Agriculture, Arts, Science, Education or Commerce.
*Value*: $250.
*Conditions*: Awarded to an undergraduate student who is especially interested in co-operative marketing. Basis of the award will be academic standing and participation in relevant extracurricular activities.
*Donor*: Bequest of the late Harvey Renkenberger of Barons, Alberta.
*Apply*: Administrator of Student Awards by June 15.

*The Frederick A. Scherrer Scholarship in Science*

*Value*: $500.
*Conditions*: Awarded on the basis of outstanding merit to a student entering fourth year honors.
*Donor*: Endowed by the late Mr. F. A. Scherrer.

*The Sunwapta Broadcasting Limited Scholarship*

*Field of Study*: Communications as related to the Broadcasting and Television Industry.
*Value*: $200.
*Conditions*: Open to students entering fourth year Electrical Engineering or Honors Physics, or entering third or fourth years in Arts who have an interest in journalism or script writing.
*Donor*: Dr. G. R. A. Rice.
*Apply*: Administrator of Student Awards by June 15.

## 223.18.3 / BOTANY

*The J. E. Olsen Prize in Botany*

*Value*: $35.
*Conditions*: Offered to the graduating student who has achieved the highest average mark in two or more senior botany courses, provided that the student's general record is satisfactory to Faculty Council.

## 223.18.4 / CHEMISTRY

*The Professor Osman James Walker Memorial Scholarship*

*Field of Study*: Chemistry.
*Value*: $150.
*Conditions*: Awarded annually to a graduating student selected by the Department who will be proceeding to graduate work in the Department of Chemistry at The University of Alberta. In the event that no suitable applicant is selected, the award will go to the student with the highest record in the fourth year of the Honors Chemistry program.
*Donor*: Endowed by friends of the late Professor Walker, a former head of the Department.
*Apply*: Department Head by May 1.

*The Society of Chemical Industry Merit Awards*

*Field of Study*: Biochemistry, Chemistry and Chemical Engineering.
*Value*: A gold key, and a year's subscription to "Chemistry and Industry."
*Number*: 3.
*Conditions*: Awards will be made to the student graduating with the highest standing in each of Honors Biochemistry, Honors Chemistry and Chemical Engineering provided an average of 7.0 is attained in the final year, and that the program has been completed in the normal number of years.

*The Chemical Institute of Canada Prize in Chemistry*

*Value*: $25 in books.
*Conditions*: Awarded to the student who obtains the highest standing in the work of third year Honors Chemistry provided that such student's record is otherwise satisafactory to the Faculty Council.

*The Lehmann Prize in Chemistry*

*Value*: $50 in books.
*Conditions*: Awarded to the student making the best record in Chemistry 230, provided such student's record is otherwise satisfacto the Faculty Council.
*Donor*: Estate of the late Dr. A. L. F. Lehmann, formerly head of the Department.

*The Fred H. Irwin Memorial Prize in Organic Chemistry*

*Value*: $40 book prize.
*Conditions*: Awarded to the student making the best record in Chemistry 550.
*Donor*: Mr. and Mrs. Leslie H. Irwin in memory of their son, Flying Officer F. H. Irwin who lost his life March 19, 1945, while on operations.

*The Herbert E. Morris Prize in Chemistry*

*Value*: $150.
*Conditions*: To be awarded to a student of outstanding merit entering final year of the Honors Chemistry program.
*Donor*: Endowed by Mrs. Morris in memory of her husband, a graduate of this University.

223.18.5 / GEOGRAPHY

*The Canadian Association of Geographers Book Prize*

*Conditions*: Award is granted annually to the graduating student who has specialized in Geography and who has demonstrated the greatest proficiency in this subject.

*Alberta Geography Prizes*

*Value*: $50 plus one-year membership in the Canadian Association of Geographers.
*Number*: 3.
*Conditions*: Awarded (1) to the freshman student receiving the highest mark in Geography 201, (2) to the second year student specializing in Geography who receives the highest mark in Geography 300 and 301, (3) to the third year student who has shown the greatest proficiency in Geography. In all cases the students' work must be otherwise satisfactory.
*Donor*: Mr. Donald C. Lofquist, M.A.

223.18.6 / GEOLOGY

*The Association of Professional Engineers of Alberta Gold Medal in Geology*

*Conditions*: Awarded to the student graduating from either the general or honors program in Geology with the highest standing in the final year provided this is at least 7.0.

*The Alberta Society of Petroleum Geologists Prize in Stratigraphy*

*Value*: A copy of "The Western Canada Sedimentary Basin" and a $50 gift certificate entitling the recipient to his selection of the Society's publications.
*Conditions*: Offered annually to an undergraduate student who, in the opinion of the Department of Geology, has made the most progress in the study of stratigraphical Geology.

*The Association of Professional Engineers of Alberta John A. Allan Memorial Scholarship in Geology*

*Value*: Tuition and fees.
*Conditions*: Offered annually to a student who obtains the highest standing in all the prescribed courses of first year Geology.
*Donor*: The Association in memory of Professor John A. Allan.

*The Association of Professional Engineers of Alberta Geophysical Scholarship*

*Value*: Tuition and fees.
*Conditions*: Offered annually to a student of outstanding merit entering the third or fourth year of Honors Geology and Physics or Honors Physics (Geophysics option).

*The Cactus Drilling Corp. Ltd. Bursary*

*Field of Study*: Geology or Engineering.
*Value*: $500.
*Conditions*: Offered to a student entering final year of the general or honors program in Geology or final year Engineering on a basis of academic standing, financial need and contribution to extracurricular student activities.
*Apply*: Administrator of Student Awards by June 15.

*The Canada-Cities Service Petroleum Corporation Bursary*

*Field of Study*: Geology or Engineering.
*Value*: $500.
*Conditions*: Offered annually to a student entering fourth year in Honors Geology or Engineering who has indicated an interest in the petroleum field of study. Basis of award will be academic standing and financial need.
*Apply*: Administrator of Student Awards by June 15.

*The Chevron Standard Limited Scholarship in Geology*

*Value*: $500.
*Conditions*: Offered to a student of outstanding merit entering the final year of Honors Geology who is interested in oil exploration or production. Preference will be given to a male Canadian citizen.

*The Chevron Standard Limited Geophysical Scholarship*

*Value*: $500.
*Conditions*: Offered to a student of outstanding merit entering third or fourth year of Honors Geology and Physics or Honors Physics (Geophysics option) and who is interested in oil exploration or production. Preference will be given to a male Canadian citizen.

*The Thomas Payne Memorial Prize in Economic Geology*

*Value*: $50.
*Conditions*: Offered annually to the student obtaining the highest standing in Geology 460, provided that the student obtains a grade of at least 7 in that subject and has been registered in a full program.
*Donor*: Endowed by the family and friends of the late Mr. Payne.

*The P. S. Warren Prize in Geology*

*Value*: $100.
*Conditions*: Awarded to a non-graduating student for outstanding achievement in Geology 201, provided the student's record is otherwise satisfactory.
Donor: Endowed by the Edmonton Geological Society.

223.18.7 / MATHEMATICS

*The A. Wyman Memorial Gold Medal in Mathematics*

*Conditions*: Offered to the student in the graduating year of the honors program who secures the highest standing, provided that the student's record is otherwise satisfactory.
*Donor*: The family of the late Mr. Wyman.

*The Ernest Wilson Sheldon Memorial Prize in Mathematics*

*Value*: $50.
*Conditions*: Awarded to a student of outstanding merit completing third year of the honors program in mathematics. The award will be based on performance in the mathematics courses of the third year.
*Donor*: Endowed by Mrs. Sheldon in memory of the late Dr. E. W. Sheldon, Emeritus Professor of Mathematics.

*The J. W. Campbell Memorial Prize in Mathematics*

*Value*: $50.
*Conditions*: Awarded annually to a student of outstanding merit in Mathematics 206, provided that the student's record is otherwise satisfactory to the Faculty Council.
*Donor*: Endowed by Mrs. J. W. Campbell in memory of her husband, former Head of the Department of Mathematics.

*The Annie Fefferman Prize in Mathematics*

*Value*: $25 in books.
*Conditions*: Offered to the student who obtains highest standing in Mathematics 201, provided that his general record is satisfactory to the Faculty Council.
*Donor*: The family of the late Mrs. Fefferman.

223.18.8 / PHYSICS

*The Sam Fefferman Memorial Gold Medal in Honors Physics*

*Conditions*: Awarded to an outstanding student graduating from any of the honors programs in the Department of Physics, provided first class standing is obtained in Physics.
*Donor*: The family of the late Mr. Fefferman.

*The Association of Professional Engineers of Alberta Gold Medal in Geophysics*

*Conditions*: Offered to a student with the highest standing in the final year of Geophysics, provided that grade-point average of at least 7.0 is attained.

*The Louis S. Crosby Memorial Gold Medal in Physics*

*Conditions*: Awarded annually to the student obtaining the highest standing in the final year of Honors Physics (Pure Physics program), provided that the student has carried a full year's work and obtained a grade-point average of at least 7.0.
*Donor*: The family of the late Mr. Crosby.

*The Association of Professional Engineers of Alberta Geophysical Scholarship*

*Value*: Tuition and fees.
*Conditions*: Offered annually to a student of outstanding merit entering the third or fourth year of Honors Geology and Physics or Honors Physics (Geophysics option).

*The Canadian Society of Exploration Geophysics Scholarship*

*Value*: $350.
*Conditions*: Offered annually to a male student of outstanding merit entering the third or fourth year of the Honors Physics (Geophysics option) program or a closely related field.

*The Chevron Standard Limited Geophysical Scholarship*

*Value*: $500.
*Conditions*: Offered annually to a student of outstanding merit who is entering the third

or fourth year of Honors Geology and Physics, or Honors Physics (Geophysics option), and who is interested in oil exploration or production. Preference will be given to a male Canadian citizen.

*The Society of Exploration Geophysicists Scholarships*

*Field of Study*: Geophysics.
*Value*: $500 each.
*Number*: 4 for Canada.
*Conditions*: Open to Canadian students majoring in Geophysics. The awards will be based on academic standing and financial need and are open to matriculants, undergraduates or graduate students.
*Where Tenable*: Any university in Canada.
*Apply*: Application forms may be secured from Canadian Society of Exploration Geophysicists Scholarship Sub-committee, P.O. Box 117, Calgary, Alberta and should be returned completed to the same address by March 15.

*The Cyril G. Wates Memorial Prize*

*Value*: $50.
*Conditions*: Awarded to a student of outstanding merit in Astronomy 253 or 410. The award will be based on the record in these courses only.
*Donor*: Mrs. Wates.

223.18.9 / PSYCHOLOGY

See under the Departments of the Faculty of Arts, § 223.4.15.

223.18.10 / ZOOLOGY

*The William Rowan Memorial Scholarship*

*Value*: $100.
*Conditions*: Offered annually to a student of outstanding merit entering fourth year of the Honors Zoology program.
*Donor*: Endowed by friends of the late Dr. Rowan, former head of the Department.

# 224 / AWARDS IN THE FACULTY OF GRADUATE STUDIES

## 224.1 / *General Information*

The following Scholarships and Fellowships are awarded primarily on a basis of academic standing. In general, awards are made only to applicants whose previous academic standing is either First Class or high Second Class. Students admitted to the "Qualifying year" are not eligible for major scholarships or fellowships.

Unless otherwise stated, awards are for one year only, but application for renewal will be considered. No award will be made to other than a full-time student. Unless otherwise stated, awards are tenable only at The University of Alberta.

Unless the terms specify otherwise, awards of less than $2,400 will be paid over the eight-month academic term beginning September 1. Awards of $2,400 or more will be paid over twelve months starting May 1 or September 1.

In order that awards may be equitably distributed no student may hold more than one major award in a given year. A major award is defined generally as $2,000 or more for eight months or $3,000 for twelve months. Holders of major awards may accept, in addition, minor awards up to a maximum of $600.

Holders of major awards may not accept a teaching or other assignment involving more than the equivalent of four hours per week during the academic session or a total of 100 hours during a twelve-month period. Holders of awards up to $600 may accept full assistantships. Holders of awards of intermediate value will be dealt with as individual cases. Holders of Dissertation Fellowships may not accept any such duties.

Holders of awards must pay regular tuition fees unless otherwise stated.

## 224.2 / *Awards*

### *The University of Alberta Graduate Fellowship*

*Value*: $5,000.
*Conditions*: This is the senior fellowship within the Faculty and is open to students who have completed at least one year of graduate study and register for a full-time doctoral program. The recipient is expected to carry out a full-time research program during the summer months. Tenure to begin May 1 or September 1.
*Donor*: The Escheated Estates Fund of The University of Alberta.
*Apply*: Administrator of Student Awards by February 1.

### *The Alberta Government Telephones Centennial Fellowship*

*Field of study*: Telecommunications.
*Value*: $3,600 to $5,000 per year for two years.
*Conditions*: Offered annually to a graduate in Engineering, Physics, Mathematics or allied fields from a University in Canada to pursue a Ph.D. program in the field of telecommunications. Any difference between the amount awarded (according to the circumstances of the recipient) and $5,000 will be considered a grant-in-aid to the department involved to be used in the interests of the particular program on which the recipient is working. Preference will be given to residents of Alberta. (If in the opinion of the Department, it would be preferable to continue the award for a third year rather than select a new recipient in any one year, this may be considered by the Scholarship Committee.)
*Apply*: Administrator of Student Awards by February 1.

### *The Associated Engineering Services Ltd. Scholarship*

*Field of study*: Civil Engineering in the Municipal or Structural fields.
*Value*: $2,500 for first year of graduate study or $3,000 for subsequent years.
*Conditions*: Offered to a student in the above fields of study.
*Apply*: Administrator of Student Awards by February 1.

### *The W. S. Buchanan Book Prize*

*Field of study*: History or English.
*Value*: $100.
*Conditions*: Awarded alternately in the Department of History and the Department of English to a graduate student of outstanding merit.
*Donor*: Mr. W. S. Buchanan, Winnipeg.
*Apply*: On nomination of Department.

### *The Faculty of Business Administration and Commerce Graduate Bursary Fund*

*Field of study*: M.B.A. program.
*Value*: Up to $3,000.
*Number*: Variable.
*Conditions*: Basis of award will be academic standing and financial need.
*Donor*: Members and friends of the Faculty.
*Apply*: Administrator of Student Awards by February 1.

### *The Canadian Sugar Factories Limited Scholarship*

*Field of study*: Agriculture.
*Value*: $500.
*Conditions*: Preference given to research related to irrigation farming.
*Apply*: Administrator of Student Awards by February 1.

*The Chemcell Limited Fellowship*

*Field of study*: Chemical Engineering.
*Value*: $2,400 plus a $600 grant to the Department.
*Conditions*: Offered annually for graduate study in Chemical Engineering.
*Apply*: Administrator of Student Awards by February 1.

*The Delta Delta Delta Alumnae Fellowship*

*Value*: $1,000.
*Conditions*: Offered annually to a woman student of outstanding academic merit graduated from a degree program of The University of Alberta. Preference will be given to a student entering her first year of graduate work immediately following her undergraduate degree.
*Where tenable*: At The University of Alberta or any other accredited University.
*Apply*: Administrator of Student Awards by February 1.

*Dissertation Fellowships*

*Value*: $4,200.
*Number*: Variable—25 or more.
*Conditions*: Designed for students who have a reasonable expectation of completing a doctoral program within the following twelve months. Tenure must begin between May 1 and October 1. Candidacy examination must be passed before tenure begins. No other duties, teaching or otherwise, may be undertaken, and the recipient must be working full-time on his program.
*Donor*: The University of Alberta.
*Apply*: Awards will be made on nominations from Departments. Nominations will be called for by March 1.

*The James Patrick Folinsbee Memorial Scholarship in Creative Writing*

*Value*: $800.
*Conditions*: Offered annually to a graduate of outstanding ability whose primary interest is in the field of creative writing and who will be pursuing a post-graduate degree program in English Literature.
*Where tenable*: The Scholarship will be open to graduates of other universities to attend The University of Alberta, or to graduates of this University to attend here or elsewhere.
*Apply*: Administrator of Student Awards by February 1.

*The G. A. Gaherty Memorial Scholarship in Engineering*

*Value*: $3,000 over the eight month academic term.
*Conditions*: Will be made to a student graduating from the fourth year of Engineering at The University of Alberta on the basis of outstanding academic performance in a full-time undergraduate Engineering program. For students in, or proceeding to, a Ph.D. program, additional instalments to a maximum total of $2,000 may be awarded on the recommendation of the Dean of Engineering and the Head of the Department in which the student is working.
*Donor*: Calgary Power Ltd., in memory of Geoffrey Abbott Gaherty, late Chairman of the Board of Calgary Power Ltd., and devoted friend of the University.
*Apply*: Administrator of Student Awards by February 1.

*The Giant Yellowknife Mines Scholarship*

*Field of study*: Mining Engineering.
*Value*: $2,000 over the eight month academic term plus a $500 grant to the Department.
*Conditions*: Offered annually to a suitably qualified student.
*Apply*: Administrator of Student Awards by February 1.

*The International Nickel Company of Canada Graduate Fellowship in Educational Administration*

*Value*: $3,000.
*Conditions*: Offered annually for graduate study in Educational Administration.
*Apply*: Selection will be made by the Department.

*The Izaak Walton Killam Memorial Fellowships*

*Field of study*: Any except "the Arts" as defined in the Canada Council Act.
*Value*: $4,500 to $5,000 plus possible travel assistance.
*Number*: Variable.
*Conditions*: Offered to outstanding students registered in, or admissible to, a doctoral program. Applicants must have completed at least one year of graduate work before start of tenure. Granted initially for two years (subject to review after the first year), they may be renewed for further years. Tenure to begin May 1 or September 1.
*Donor*: The estate of Mrs. Dorothy J. Killam.
*Apply*: Administrator of Student Awards by February 1.

*The Men's Canadian Club of Edmonton Prize*

*Field of study*: Canadian History.
*Value*: $200.
*Conditions*: Offered annually for graduate study in the field of Canadian History. It is suggested that the prize be used to acquire books in this field.
*Apply*: Awarded on nomination by the Department.

*The Harold Hayward Parlee Memorial Fellowship*

*Value*: $3,600.
*Conditions*: Open to students who have completed one year of graduate study and

register for a full-time doctoral program. Recipient is expected to carry out a full-time research program during the summer months. Tenure to begin May 1 or September 1.
*Donor*: The Winspear Foundation, in memory of H. H. Parlee, Chairman of the Board of Governors of The University of Alberta from 1940 to 1950.
*Apply*: Administrator of Student Awards by February 1.

*The Pfizer Research Scholarship*

*Field of study*: Pharmacy.
*Value*: $300.
*Conditions*: Offered annually to a Pharmacy graduate of The University of Alberta who is undertaking graduate work in the Faculty, preferably in hospital pharmacy or biopharmacy.
*Apply*: Awarded on recommendation of the Faculty.

*Province of Alberta Graduate Fellowships*

*Value*: $4,200.
*Number*: Variable—10 or more.
*Conditions*: Open to students who have completed at least one year of graduate study and register for a full-time doctoral program. Recipients are expected to carry out a full-time research program during the summer months. Tenure to begin May 1 or September 1.
*Donor*: The Government of the Province of Alberta.
*Apply*: Administrator of Student Awards by February 1.

*Province of Alberta Graduate Scholarships*

*Value*: $3,000 for first year of graduate study or $3,600 for subsequent years.
*Number*: Variable—20 or more.
*Conditions*: Normally open to all students registered in graduate studies except in a "qualifying year". The usual award is for twelve months. They may be terminated earlier by either the student or the University and the amount reduced proportionately. Tenure to begin May 1 or September 1.
*Donor*: The Government of the Province of Alberta.
*Apply*: The Administrator of Student Awards by February 1.

*The William Rea Scholarship*

*Value*: $1,000.
*Conditions*: Offered annually to a University of Alberta graduate or graduating student who shows the best aptitude in terms of scholarship and extracurricular activity for a television career in drama, music, writing, photography, engineering or business.
*Where tenable*: Any accredited University.
*Donor*: William Rea, Jr., in honor of his father, a pioneer Edmonton educator.
*Apply*: Administrator of Student Awards by February 1.

*The Francis F. Reeve Foundation Graduate Bursaries*

*Value*: $2,500.
*Number*: 5.
*Conditions*: Open to graduates of any university who are engaged in, or admissable to, a program leading to a graduate degree. The financial need of the applicant will be considered. Tenure to begin May 1 or September 1.
*Donor*: The Francis F. Reeve Foundation, Calgary, Alberta.
*Apply*: Administrator of Student Awards by February 1.

*The J. Macgregor Smith Graduate Scholarship*

*Field of study*: Agricultural Engineering.
*Value*: $2,500.
*Conditions*: Offered every odd-numbered year.
*Donor*: The estate of Mrs. Ida Baldwin Smith.
*Apply*: Administrator of Student Awards by February 1.

*The Standard Oil (Indiana) Foundation Fellowship*

*Field of study*: Engineering, Geology or Geophysics.
*Value*: $1,800 plus tuition fees over twelve months.
*Conditions*: Preference to an applicant whose research is in the field of the Petroleum Industry.
*Donor*: The Pan American Petroleum Corporation.
*Apply*: Administrator of Student Awards by February 1.

*The Henry Marshall Tory Memorial Scholarship*

*Field of study*: Mental Health.
*Value*: $300.
*Conditions*: Restricted to graduates of The University of Alberta.
*Where tenable*: Any accredited university.
*Donor*: The University of Alberta Alumni Association.
*Apply*: Administrator of Student Awards by February 1.

*The Warner-Lambert Graduate Fellowship*

*Field of study*: Pharmacy.
*Value*: $1,200 plus a grant of $300 to the Faculty of Pharmacy.
*Conditions*: Offered annually for graduate study in the Faculty of Pharmacy.
*Apply*: Awarded on recommendation of the Faculty.

*The Weber Bros. Realty Ltd. Scholarship*

*Field of study*: Business Administration and Commerce.

*Value*: $1,500.
*Conditions*: Offered annually to a student for graduate study in the Faculty of Business Administration and Commerce. Preference will be given to an applicant with a career interest in some aspect of real estate and some consideration may be given to financial need.
*Donor*: Weber Bros. Realty Ltd. in honor of the firm's founders, Lewis A. Weber and N. Roy Weber.
*Apply*: Administrator of Student Awards by February 1.

*Graduate Teaching Assistantships*

*Field of study*: Available in most Departments.
*Value*: $1,800 to $3,600 plus tuition fees, for full-time assistantships over the eight month academic term.
*Conditions*: Full-time assistantships normally require 12 hours of teaching work per week. Limited travel assistance will be paid to appointees coming 1,000 miles or more. Additional assistance for the four-month intersession may be available. Part-time assistantships may be given in some departments.
*Apply*: Head of Department concerned by March 1.

*Graduate Service Assistantships*

*Field of study*: Available in some Departments.
*Value*: $1,800 to $3,600 plus tuition fees, for full-time assistantships over the eight month academic term.
*Conditions*: Terms as for teaching assistantships except that the work involved will be to assist with departmental research.
*Apply*: Head of Department concerned by March 1.

*Graduate Research Assistantships*

*Field of study*: Available in many departments.
*Value*:
(a) University assistantships—$2,400 for twelve months for first year of graduate work or $2,800 for subsequent years, plus tuition fees and limited travel assistance for appointees coming 1,000 miles or more.
(b) Assistantships from research grants made by N.R.C. to Departments or staff members—$3,000 for twelve months.

These do not provide for fees or travel.
*Conditions*: These normally permit full-time graduate study on the holder's own program.
*Apply*: Head of Department concerned by March 1.

*Intersession Bursaries*

*Field of study*: Available in many Departments.
*Value*: $1,000 over four months.
*Number*: Variable—probably 400 or more.
*Conditions*: Awarded to students already engaged in a program leading to a graduate degree, who are prepared to spend not less than four months of the Intersession on a full-time graduate program, which may include not more than one formal course requisite to the program. Holders of twelve month awards are not eligible. Awards for fewer than four months may be made where circumstances warrant. Recipients must have been full-time graduate students during the immediate preceding academic term. Tenure must begin May 1.
*Donor*: The University of Alberta.
*Apply*: Awards will be made on recommendation by Departments.

## 224.3 / *Post-doctoral Fellowships*

### 224.3.1 / THE UNIVERSITY OF ALBERTA POST-DOCTORAL FELLOWSHIP PROGRAM

The University approved a Post-doctoral Fellowship program starting with appointments for 1966-67. For the first year approximately forty-one fellowships were awarded.

Fellowships are available in all fields of study. They are valued at $6,000 (income tax free) for twelve months plus travel expenses in the amount of one-way economy air fare. Appointments are for one year but are renewable for a second year. Departments may offer an additional $2,000 stipend if the Fellow teaches a full formal course as part of his duties. The additional stipend is taxable.

Tenure may begin at any date which is mutually satisfactory to the Fellow and the department concerned. If the Fellow is to teach as part of his duties, tenure would normally begin not later than September 1.

Many departments will have appointed their Fellows for 1968-69 by the time this calendar is in print. Nevertheless enquiries are invited for awards for 1968-69 and 1969-70. Information may be obtained from departments or from the office of the Dean, Faculty of Graduate Studies.

### 224.3.2 / IZAAK WALTON KILLAM MEMORIAL POST-DOCTORAL FELLOWSHIPS

Fellowships are available in all fields of study. They are valued at $6,500 (income tax free) for two years plus travel expenses in the amount of return economy air fare. Appointments are for two years. Departments may offer an additional stipend of up to $2,000 if the Fellow teaches a full formal course as part of his duties. The additional stipend is taxable.

Applications should be made by February 1, to the Dean, Faculty of Graduate Studies.

# 225 / GRADUATE AWARDS MADE BY OTHER AGENCIES

## 225.1 / *Introductory Note*

It is requested that any student receiving one of the awards listed in the following section report the fact to the Administrator of Student Awards as a matter of information.

Graduate awards in Dentistry, Medicine, Nursing, and Pharmacy are not listed in §§ 225.2 or 225.3 but in a special section, § 225.4.

## 225.2 / *Awards Tenable at The University of Alberta or Elsewhere*

*Alberta and Southern Gas Co. Ltd. Graduate Scholarship* of $1,000 is offered annually for graduate study in Engineering at The University of Alberta. Preference will be given to an applicant whose research program will be in a field of specific interest to the natural gas industry.

Application forms may be secured from The Alberta and Southern Gas Co. Ltd., 503 Natural Gas Building, Calgary, and must be submitted by March 1.

*The Alberta Teachers' Association Graduate Scholarships in Education,* each in the amount of $500, are offered annually to students who, having graduated with a Bachelor of Education degree from a university in Alberta are proceeding to graduate work. Each applicant must be a bona fide resident of Alberta. He must give evidence of superior academic and professional promise, capacity for leadership, and intention to follow teaching as a career. The scholarship is payable upon registration for intramural study during a regular session in the graduate school of a university of recognized standing, provided that such study be commenced not later than two years following the award.

Application should be made to the Executive Secretary, Alberta Teachers' Association, Barnett House, Edmonton, not later than May 15.

*The John Walker Barnett Fellowship in Education* of $2,400 is offered to residents of Alberta, who are members of the Alberta Teachers' Association, and who are admitted to the Faculty of Graduate Studies of any recognized university for intramural study at a regular winter session on a doctoral program in education.

Application forms are obtainable from the Executive Secretary, Alberta Teachers' Association, Barnett House, Edmonton and should be returned by March 15.

*Bell Canada Centennial Fellowships.* Four fellowships of $3,500 each are offered to Canadian citizens or permanent residents of Canada for graduate study in any field of study relevant to the scientific, political, social or economic needs of Canada. The award may be held at any accredited university in Canada and is renewable for one additional year. In addition, the donor will provide a grant of $1,500 from which tuition fees and other expenses related to the recipient's program will be paid.

Apply by March 15 to the Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa 4, Ontario.

*The British American Oil Company Limited Graduate Fellowships.* Five fellowships of $3,000 to the student plus $1,000 to the department of the university, will be offered annually and are open to residents of Canada who are graduates of a Canadian university, for graduate study in any field at a Canadian university.

Application forms may be obtained from Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa 4, and must be filed complete by March 1.

*The Canada Council Awards*—These are provided in the fields of the arts (defined as architecture, the arts of the theatre, literature, music, painting, sculpture, the graphic arts and other similar creative and interpretative activities), the humanities and the social sciences.

Doctoral Fellowships. Values up to $3,500 for students who have not completed their residence requirement or up to $4,500 if residence requirement completed. Apply by December 15.

Candidates must have completed one year of graduate study by the date of taking up an award.

Travel grants may be given in addition where necessary.

Further information may be obtained from the Administrator of Student Awards or by writing directly to The Canada Council, 140 Wellington St., Ottawa 4.

*The Canadian Federation of University Women Fellowships.* The Federation offers three fellowships annually to women who

hold a degree from any Canadian University. The awards are based on evidence of character, intellectual achievement, and promise of success in the subject to which the candidate is devoting herself. The proposed place and plan of study must be approved by the Federation.

The three fellowships are as follows:

(1) *Margaret McWilliams Fellowship of* $3,000. This is open to applicants who already hold a Master's degree and who wish to carry out doctoral study or research abroad. Preference will be given to those who have already started their graduate study.

(2) *Junior Fellowship* of $2,000. This is open to any woman student whose domicile is in Canada and who intends to embark on a Master's program.

(3) *Professional Fellowship* of $2,000. This is open to applicants whose domicile is in Canada and who desire to spend a year at an accredited Library School, College of Education, or similar professional school.

Application blanks and further information may be obtained from the Chairman of the Fellowship Committee, Miss Gladys R. Munnings, Apt. 4E, 4 Deer Park Cres., Toronto, 7, Ontario. Applications and all other necessary documents must be received in Toronto not later than February 1.

In addition the C.F.U.W. will select Canadian candidates for various awards granted by the American F.U.W. and the International F.U.W. Application dates are December 1 and November 1 respectively.

*Chemcell Limited Fellowships.* Six fellowships of $2,500 each are offered annually to Canadian residents or graduates of a Canadian university for postgraduate study in Canada in Engineering, Chemistry, Physics or Mathematics. In addition a $1,000 grant-in-aid will be provided to the Department involved. The award may be held for up to three academic years.

Apply to Director of Awards, Association of Universities and Colleges of Canada, 151 Slater St., Ottawa 4, Ontario, by March 1.

*Canadian Good Roads Association Scholarships*—Several scholarships, each valued at $2,000 and tenable for one year, are offered annually through the Canadian Good Roads Association for graduate study in Transportation Engineering.

Applications should reach the Association at 270 McLaren Street, Ottawa, not later than April 15.

Further information may be obtained from the office of the Dean, Faculty of Engineering.

*The Chevron Standard Limited Graduate Fellowships*—The Chevron Standard Limited offers annually five graduate fellowships which are tenable in selected Canadian universities to students proceeding to a graduate degree in one of the fields of Geology, Geophysics, or Petroleum Engineering. The fellowships are tenable for one year in the amount of $1,000 each, plus a grant of $500 to the university department concerned. The awards are primarily intended to assist male Canadian students who are interested in the Earth Sciences or Petroleum development and production. They will be awarded on the basis of scholastic ability, field of interest, the recommendation of the Department in which the student plans to conduct his graduate work, plus the concurrent recommendation of the Head of the Department in which the student conducted his undergraduate studies. Application forms which list the universities in which the fellowships are tenable may be obtained from the Administrator of Student Awards, the Department Head, or by writing directly to the Company. They should be prepared in duplicate, one copy to be forwarded to the Head of the Department in which the candidate is applying for admission, and the other to the Secretary, Aids to Education Committee, Chevron Standard Limited, 329A - 6th Avenue S.W., Calgary, Alberta, prior to March 31st of the year in which the graduate program is to be undertaken.

*C.I.L. Wildlife Management Fellowships*—Fellowships of the value of $1,500, of which $1,200 is paid to the student and $300 to the Department in which the student is working, are available to any university graduate undertaking postgraduate studies in wildlife management at a Canadian university. Fellowship holders may receive summer grants of $1,000 to finance field work.

Apply through the Head, Department of Zoology, by March 1, so that completed recommendations may be forwarded to Educational Relations Manager, Canadian Industries Limited, Box 10, Montreal, P.Q. by March 15.

*The Franki Fellowship* of $2,500 plus $500 to the Department to cover expenses in connection with the research, is offered by Franki Canada Limited, for graduate research in the field of Soil Mechanics at a Canadian university. It is open to any graduate in Engineering, Science or Agriculture of a recognized Canadian university and preferably a Canadian citizen.

Applications should be accompanied by academic transcript, a statement of experience, an outline of the proposed research

project, at least two references and a statement from the Department Head that the project can be carried out within that Department. Progress reports and a final report must be submitted to the donor.

Applications should reach the Administrator of Student Awards by April 1, in order that they may reach the Company by April 15. The decision will be announced by June 1.

*Imperial Oil Graduate Research Fellowships.* Imperial Oil Limited offers annually five research fellowships of $3,000 per year in Canadian funds for a period up to three academic years. Three fellowships are offered in the fields of Pure and Applied Science including Mathematics and two are offered in the Social Sciences and Humanities. These are open to graduates of any approved university in Canada and may be tenable at any university, approved by the donor, for graduate studies leading to a doctor's degree.

Universities wishing to sponsor one or more students should address their applications to the Imperial Oil Scholarship Committee, Imperial Oil Limited, 111 St. Clair Avenue West, Toronto 7, Ontario, by February 1.

Any student who wishes to be sponsored for this award should apply to the Administrator of Student Awards not later than January 20.

*International Nickel Graduate Research Fellowships* have been established to encourage academic research in the technical fields serving Canadian metal industries and to stimulate advanced study in industrial science in Canada. A number of fellowships of $3,800 each are tenable annually at Canadian Universities. In addition, a $700 grant-in-aid will be made to the Department in which the fellow is working in order to support his research. The normal tenure is one year but application may be made for renewal through second or third year. Awards will not normally be given in the second year of a master's program or the fourth year of a doctorate. The fields of research are: Chemistry or Physics of Metals, Geology (including Geophysics and Geochemistry), Metallurgy (both Physical and Extractive including Mineral Dressing) and Mining.

Applications must be endorsed by the University and must be channeled through the Student Awards Office. Application is to be by letter from the student's supervisor, giving full details of the proposed study project, an evaluation of the applicant, and must be accompanied by a transcript.

Applications should be in the Student Awards Office by December 15 in order to be forwarded to The International Nickel Company by January 15.

*The National Research Council Awards*—The National Research Council offers annually postgraduate awards to students of outstanding ability in Biology, Chemistry, Physics, Geology, Physical Geography, Mathematics, Experimental Psychology and the basic sciences in Agriculture and Dentistry.

(1) Scholarship of $3,600 over twelve months tenable in Canada (tenure abroad only in special cases).

(2) Bursaries of $3,000 over twelve months tenable only at the nominating university.

(3) 1967 Science Scholarships of $5,000 per year for three years. Fifty only on a national competitive basis.

Application forms and general regulations may be secured from the Administrator of Student Awards, The University of Alberta. These will be distributed to Departments concerned each year as they are received from the Council.

*The P.E.O. International Peace Scholarship* is offered to qualified foreign women students who must have a full-time graduate status working toward a degree. Inquiry should be made early in January so that completed applications, recommendations and necessary forms may be on file with the Chairman of the P.E.O. International Peace Scholarship by January 31 of the year for which the award is requested. Awards are announced about May 1. $2,100 will be the maximum granted in one calendar year. Further information may be secured from the Administrator of Student Awards, or Mrs. S. G. Davis, 9118 - 116 St., Edmonton.

*The Society of Exploration Geophysicists Scholarships*—The Society offers annually four scholarships of $500 each to Canadians majoring in Geophysics at Universities in Canada. The award will be based on academic record and financial need. Applicants may be matriculants entering first year University or undergraduates or graduate students.

Application forms may be secured from Canadian Society of Exploration Geophysicists Scholarship Sub-committee, P.O. Box 117, Calgary, Alberta, and should be returned completed to the same address by March 15.

*Soroptimist Federation of the Americas Inc.* The Western Canada Region of the Federation offers a fellowship of $1,500 to a woman student, either graduating or a graduate, whose home is in Western Canada, and who is in need of financial assistance. The award is for postgraduate study at any

university. The award is normally made only every other year, in the even years.

Application forms may be obtained from the Administrator of Student Awards. They must be forwarded to the Federation by March 1. A decision will be made by June 30.

*Steel Company of Canada Fellowships in Metallurgy.* Four fellowships of $2,500 each are offered annually to permanent residents of Canada who are graduates of a Canadian University, for research in Metallurgy. They are normally tenable for one year but in special circumstances may be renewed for a second year. In addition the donor provides a $1,000 grant-in-aid with each fellowship.

Further information may be obtained from the Administrator of Student Awards, The University of Alberta. Completed applications must be sent to The Director of Awards, Association of Universities and Colleges of Canada, 151 Slater St., Ottawa, 4 by February 28.

## 225.3 / *Awards Tenable Only at Other Institutions*

*The Athlone Fellowships*—Her Majesty's Government in the United Kingdom has established a number of Fellowships to enable Canadian engineering graduates to take postgraduate training in the United Kingdom. The fellowships will be in two groups:

(a) thirty-one available for graduates immediately after graduation;
(b) a further ten available for graduates who have already spent some time in industry.

The Fellowships will cover the cost of transport, tuition fees and maintenance and be tenable normally for a maximum period of two years.

Apply to the Administrator of Student Awards by October 15.

*The Bank of Nova Scotia Bilingual Exchange Scholarships.* Six awards will be made annually, three to French-speaking candidates and three to English-speaking candidates. Values are $1,500 for undergraduates and $2,500 for graduate students. Undergraduate awards are tenable in the second last year of a normal undergraduate program. English-speaking winners may attend any Canadian French-speaking university or college and French-speaking winners may attend any Canadian English-speaking university or college, provided that such institution is a member, or federated with or affiliated to, a member of the Association of Universities and Colleges of Canada.

Apply to Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa 4, Ontario. Completed applications must be filed by March 15.

*British Council Scholarships.* Three scholarships are offered annually to graduates of Canadian universities to provide opportunity for advanced study or research (including Fine Arts, Music and Drama) in the United Kingdom. They are not primarily intended to enable the holders to obtain University degrees or other professional or practical qualifications, although with special permission they may be allowed to do so if this does not involve an extension of the scholarship period. Preference is given to candidates who are between 25 and 35 years of age. The scholarships are normally tenable from October 1st for one academic year of ten months or very occasionally for two academic years (22 months). A full scholarship includes fares to and from the United Kingdom, tuition fees, personal maintenance grant, a grant for books and apparatus of £30 per annum and approved travelling expenses in the United Kingdom. The scholar must return to his own country at the end of his scholarship. Candidates must be graduates at the time of application.

Prospective applicants should write for further information and application forms to the British Council, 80 Elgin St., Ottawa 4, Ontario. Completed applications are due December 1 for scholarships commencing the following October.

*The Canada Scholarship at Cambridge.* The Cambridge University Canada Club and the Canadian Universities Society sponsor this scholarship which carries a value of £1,000 per annum for 2 years and is tenable at Peterhouse, Cambridge. It is open to single male candidates who already have a first degree and wish to study further in the Humanities (defined for this purpose as Archaeology, Anthropology, Architecture, Fine Arts, Classics, Economics and Politics, English, History, Law, Moral Sciences, Music, Oriental Studies and Geography). Recipients should be capable of contributing to the extracurricular activities in the life of the College.

The first award was made with tenure beginning in 1965. Further awards will be made every alternate year.

Apply by letter with supporting documents to the Director of Awards, Association of Universities and Colleges of Canada, 151 Slater Street, Ottawa 4, Ontario, by January 30.

*The Commonwealth Scholarships.* This is a joint plan to exchange approximately one thousand postgraduate students within the Commonwealth. Each Commonwealth country accepts and provides for a certain number of students from other Commonwealth countries. Scholarships are normally for a period of two years and cover all expenses and travel. Recipients need not be working towards a degree in the other country, but may be doing a year or more of research towards a degree from their home University.

Application dates vary for different countries, especially those in the Southern Hemisphere. Application date for those tenable in the United Kingdom will be October 31 of the year preceding the one in which the award is tenable.

Apply for information to Administrator of Student Awards.

*The 1851 Exhibition Science Research Scholarships*—These are to the value of £1,000 per annum for two, or in rare instances, three years, together with certain possible allowances for fees and travelling expenses. The object of the scholarship is "to enable selected students of overseas universities who have already completed a full university course to devote themselves for two years to research work in pure or applied physical or biological sciences."

A candidate must be (a) a British subject, (b) less than 26 years of age. The candidate must have been a student of science in a university or university institution for a period of not less than three years, and must have spent one full academic year ending not more than twelve months prior to the date of recommendation at the institution by which he is recommended.

The scholarship is tenable in the United Kingdom or abroad, but not normally in a country in which the student has already studied.

Students intending to apply for this scholarship should communciate with the Administrator of Student Awards before February 15 so that applications may be in London by March 21.

*The Imperial Chemical Industries and The Turner and Newall Research Fellowships.* These fellowships are tenable at the University of London and are of the value of £1,000-£1,200 per annum for three years.

The Imperial Chemical fellowships are for study in Biochemistry, Chemistry, Chemotherapy, Engineering, Metallurgy, Pharmacology or Physics.

The Turner and Newall fellowship is for study in Engineering, Inorganic Chemistry or Physics.

Detailed regulations and applications may be obtained from the Academic Registrar, University of London, Senate House, W.C.1. They must be received complete by him by April 1.

*The I.O.D.E. War Memorial I and War Memorial II Postgraduate Overseas Scholarships.* The Imperial Order Daughters of the Empire offers a number of scholarships for graduate study in any university in the British Commonwealth. Values are $3,000 if tenure is outside of Canada, or $2,000 if in Canada. Recipients may accept additional awards up to $2,000 if outside of Canada or up to $1,000 if in Canada. Holders may apply for renewal for a second year.

Fields of study are:

War Memorial I—History, Economics, Constitutional Government or any subject vital to the interest of the Commonwealth.

War Memorial II—The Humanities.

Applicants must be Canadian citizens and have passed their twentieth, but not their thirtieth birthday in October of the year of tenure. They must hold a degree from a Canadian university and must have done or be doing postgraduate work. Candidates must apply in the province in which the university is situated from which he or she has graduated, irrespective of place of residence.

Apply to the I.O.D.E. Scholarship Secretary, Mrs. D. F. Rutherford, 5452 - 111A Street, Edmonton, Alberta, by October 15.

*The Johnson's Wax Fund Graduate Scholarship*—The Johnson Foundation, Racine, Wisconsin, makes available biennially to at least one student graduating from a Canadian University an award designed to cover the cost of travel and one academic year of study at a United States university or college of the student's selection. The award will be made for academic sessions beginning in each odd-numbered year.

Applications should reach the Administrator of Student Awards not later than December 15 so that they may be forwarded to Brantford, Ontario by January 15.

*The Mackenzie King Travelling Scholarships.* Several scholarships of $2,000 each will be offered to graduates of Canadian universities for postgraduate study in the United States or the United Kingdom in the field of International or Industrial Relations (including Law, History, Politics or Economics).

Personal qualities and aptitudes will be considered as well as academic standing.

Apply to Dean Walter H. Gage, University of British Columbia, Vancouver 8, Canada, by March 1.

*The Frank Knox Memorial Fellowships* of $2,000 plus tuition fees, will be offered annually to two male Canadian citizens for one year's postgraduate study at Harvard University. Special consideration will be given to extra-curricular activities.

Applications must be made through the student's own University by November 15, so that completed applications may be in Ottawa by December 1. Information may be obtained from the Student Awards Office.

*The Massey Foundation Fellowships* each of $2,000 to $2,500 per annum, are offered to Canadian citizens for graduate study at the American University, Washington, D.C. Fields of study are chiefly Arts and Science, Business Administration and Education. Applications, fully documented, must reach the American University not later than March 1 of each year. For further information write to the office of the Graduate School, the American University, Washington 16, D.C. or contact the Student Awards Office.

*The Rhodes Scholarship.* This scholarship is valued at £1,100 per year and is tenable at the University of Oxford for two years (with possible renewal for a third year).

Applicants must be unmarried male Canadian citizens or British subjects with at least five years residence in Canada and must have passed their nineteenth, but not their twenty-fifth birthday on October 1 of the year of tenure. They must have completed at least two years at a Canadian university by the date of tenure. Application may be made either in the province of residence or in the province in which the university being attended is situated.

Qualities of character and interest in athletics will be considered as well as academic standing.

The date of application is October 25. Further particulars may be secured from the Student Awards Office or from Mr. J. E. Redmond, Secretary of the Alberta Rhodes Scholarship Committee, Seventh Floor, Bank of Montreal Building, Edmonton, Alberta.

*Rotary Foundation Fellowships.* These are provided by Rotary International for graduate study in a country other than the student's home country. Applicants must be single and must be over 20 but not over 29 years of age. Preference will be given to studies in the humanities, languages or social sciences but other fields will be considered.

The fellowship is for one academic year and covers return travel, tuition fees, books, living and incidental expenses. Rotary District No. 536, comprising Alberta and adjacent parts of Saskatchewan and British Columbia selects such a candidate every other year.

Application with supporting documents should be made by March 15 of any even-numbered year for the fellowship to begin in the next following odd-numbered year. Applications should be filed with the nearest Rotary Club. For further information contact the Administrator of Student Awards, University of Alberta or the nearest Club within the above-mentioned District.

*The Rutherford Scholarship of the Royal Society* of the value of £900 to £1,050 per annum plus allowances for travel and tuition fees is available for experimental research in any branch of the natural sciences, but if there are candidates of similar merit preference will be given to experimental physics.

Applications should be made not later than February 1 on the Exhibition of 1851 forms.

*Shell Postgraduate Overseas Scholarships.* Two scholarships of £1,100 each per annum for two years are offered to Commonwealth citizens with at least five years residence in Canada, and under 25 years of age. Travel assistance may be given.

These scholarships are tenable in an approved University in the United Kingdom in any of the following studies: Chemistry, Physics, Chemical Engineering, Engineering, Geophysics or Geology. The student should be working to a master's or doctor's degree and should already have completed or expect to complete one year of postgraduate study.

Information may be obtained from the Administrator of Student Awards and applications must be in Ottawa by January 20.

*The Woodrow Wilson National Fellowships,* each providing a stipend of $2,000 for one year, plus tuition costs and allowances for dependent children, are available to outstanding students who are either undergraduates in their final year or graduates who have not yet entered a liberal arts graduate school. The intention of all applicants must be to prepare themselves by graduate study for a career in college teaching in the natural or the social sciences or the humanities. These are tenable in the United States or Canada.

In the first instance, candidates are nominated by faculty members. Since nominations must reach the officers of the Fellowship Foundation no later than October 31 for Fellowships tenable in the

next academic year, intending candidates should get in touch with the head of the department concerned as early as possible in the first term.

## 225.4 / *Graduate Awards in Special Fields*

### 225.4.6 / DENTISTRY

*The Postgraduate Scholarship Fund in Dentistry* has been established through the generosity of members of the Dental profession. The purpose of this fund is to assist dental graduates in pursuing postgraduate studies at other institutions in preparation for teaching. Younger persons will be given preference. Applications should be made to the Dean. All applications must be submitted to the Council of the Faculty of Dentistry for approval.

*The Canadian Dental Association Fellowships and Studentships.* The Canadian Dental Association offers fellowships and studentships to suitable students or graduates who desire to prepare themselves further for scientific research by continuing their study in the sciences fundamental to their research fields.

(1) Fellowships are for an academic year of special study in the fundamental sciences or for travel to visit outstanding authorities or to attend research conferences.
(2) Studentships are for summer or part-time employment as an assistant in a recognized research laboratory.

Factors considered in making the awards are: evidence of capacity for original research, and scholastic ability in scientific fields.

The candidate shall state the institution at which he intends to study and the general line of work to be followed. A transcript of university record and a letter of recommendation from the dean of a dental school should accompany the application.

Apply to Canadian Dental Association, 234 St. George Street, Toronto 5, Ontario by April 1.

*The National Research Council Dental Fellowships.* The Council offers a limited number of fellowships to provide advanced training and research in the sciences basic to Dentistry (not including clinical training). The basic amount is $3,500 which may be increased for each year of additional qualification. Applicants must be graduates in Dentistry, Medicine or Veterinary Medicine.

Application forms may be obtained from the Council or from the office of the Dean of Dentistry. They must be received complete by January 15 by the Secretary, Associate Committee on Dental Research, National Research Council, Ottawa 7, Ontario.

### 225.4.11 / LAW

*The Carswell-Sweet and Maxwell Scholarship in Law.* From 1960 a scholarship will be offered to be open to all final year and postgraduate law students in Canada, and which will be tenable for one year at Cambridge University. The student will be required to do postgraduate work in Anglo-Canadian Law. The value of the scholarship will be $2,000 and the cost of travel to Great Britain and return will be paid in addition. Application forms may be obtained from the Dean of the Faculty of Law.

*The Viscount Bennett Trust Fund Scholarship.* Under the terms of a deed of gift to the Canadian Bar Association from the late Right Honorable Viscount Bennett, P.C., K.C., LL.D., D.C.L., Honorary Life President of the Association, a trust fund known as the Viscount Bennett Trust Fund has been established. The annual income from the fund or the sum of $2,000, whichever is the less, will be paid annually as a scholarship for postgraduate study of law at an approved graduate school.

The scholarship is open to final year and graduate students of approved Canadian law schools, of which the Faculty of Law of The University of Alberta is one.

Applications for this scholarship should be received by the Dean of the Faculty of Law before December 31.

*The Viscount Bennett (Law Society of Alberta) Graduate Scholarship* of $2,500 is made available from a Trust founded by the late Viscount Bennett. It is offered to graduates of the Faculty of Law, The University of Alberta, for post-graduate study in Law at The University of Alberta or at another recognized institution. Applicants should state an intent to return to Alberta following such study.

Apply to the Dean, Faculty of Law, by February 1.

### 225.4.13 / MEDICINE

*The Medical Research Council Awards.* Awards of $3,600 or $3,000 are provided by the Council for students who have a B.Sc. and are proceeding to an M.Sc. or Ph.D. program in a basic medical science under the supervision of a department in a Faculty of Medicine.

Application should be made direct to Administrative Officer, Personnel Support Programs, Medical Research Council, Montreal Road, Ottawa 7, Ontario. Closing appli-

cation dates are January 1 for the March competition and April 1 for the June competition.

For further information inquire of the Student Awards Office or the office of the Dean of Medicine.

*The Percy Hermant Fellowships in Ophthalmology*. Two awards of $1,000 each will be offered annually by Imperial Optical Company to medical graduates of a Canadian university for further study in Ophthalmology at The University of Alberta, or at another approved institution. Applicants must indicate an intention to subsequently practise this specialty in Canada.

Apply to Head, Division of Ophthalmology, Department of Surgery, The University of Alberta, by March 1.

*The University of Alberta Eye Research Fellowship* of $5,000 per annum is offered to a medical doctor for post-graduate research under the auspices of the Retina Foundation—Institute of Biological and Medical Sciences in Boston, Massachusetts. A recipient may apply for renewal for a second or third year of work at the Retina Foundation. Applicants must be Canadian citizens and state an intention to return to Canada to practise.

Apply to Administrator of Student Awards, The University of Alberta, Edmonton, by April 1 for the year beginning July 1.

### 225.4.14 / NURSING

*Professional Training Grants*—Financial assistance is available to graduate nurses pursuing post-graduate study in any field of nursing. Application should be made to the Deputy Minister of Health, Department of Public Health, Administration Building, Edmonton, Alberta.

*The University of Alberta Hospital School of Nursing Alumnae Association Scholarship* —Financial assistance is available to graduates of the School to undertake post-graduate work in any field of nursing. Applications should be addressed to the Secretary of the Alumnae Association c/o Office of Director of Nursing, University of Alberta Hospital.

### 225.4.15 / PHARMACY

*The Pfizer Research Scholarship* of the value of $300 is offered annually to an outstanding Pharmacy graduate of The University of Alberta who is undertaking graduate work in the Faculty, preferably in hospital pharmacy or biopharmacy.

Selection will be made by the Faculty.

*The Warner-Lambert Graduate Fellowship* of the value of $1,200 is offered annually to a student of outstanding merit undertaking graduate work in Pharmacy at The University of Alberta. A supplementary grant of $300 for equipment and supplies will also be made to the Faculty of Pharmacy.

Selection will be made by the Faculty.

*Medical Research Council Awards in Pharmacy*. Scholarships are available from the Council for graduate study in Pharmacy. For information inquire of the Dean of the Faculty or the Medical Research Council, Montreal Road, Ottawa 7, Ontario.

### 225.4.25 / SOCIAL WORK

*The Mary A. Finlay Scholarship in Social Work* of $1,000 per year for two years is provided by the Robert Tegler Trust for study in Canada, the United Kingdom or the United States, towards a masters or doctors degree in Social Work or related fields and will normally be awarded every alternate year. The second year will be dependent on satisfactory completion of the first year.

Applicants must be residents of the Province of Alberta and recipients will be required to agree to work in their profession within the Province for at least two years immediately upon completion of their advanced study.

Apply in writing with two letters of recommendation to the Trustees of the Robert Tegler Trust, 820 Tegler Building, Edmonton, by April 15 of the year in which the award is to be made. Inquiry should be made of the donor to determine in which year it will be available.

*The Imperial Order Daughters of the Empire Bursary in Social Work* of $500 is offered to a graduate of an Alberta university to take training at any recognized School of Social Work in Canada. When a successful candidate undertakes a two year program leading to a Master of Social Work degree, such candidate may apply for reappointment for the second year. The application will be in open competition with those submitted for the first year of study.

Academic standing, suitability of personality, good health and financial need will be major considerations in determining this award.

Application forms may be secured from the I.O.D.E. Scholarship Secretary, Mrs. D. F. Rutherford, 5452 - 111A St., Edmonton, Alberta, and should be submitted to her on or before June 1.

*The Junior League of Edmonton Bursary for Post-Graduate Study in Social Work* of an amount up to $1,500 is offered to a graduate of any recognized University to

assist training at an accredited School of Social Work. The winner shall agree to work in an approved Social Welfare Department or Agency in the City of Edmonton for a period of one year immediately following completion of course. The bursary will be awarded on the basis of academic proficiency, suitability of personality and financial need. Preference will be given to those who have already been employed by a Welfare Agency.

Application forms should be secured from Mrs. J. B. Morgan, 15106 - 77 Ave., Edmonton, and should be completed and returned to her by June 1.

*The Kinette Bursary in Social Work* up to the amount of $750 is offered by the Kinette Club of Edmonton to graduates of The University of Alberta, or to a graduate of another university, resident in Alberta, to take training at any recognized School of Social Work in Canada. Preference will be given to an applicant who intends to work in the Province of Alberta. Academic proficiency, suitability of personality and financial need will all be considered in making the award.

Application should be submitted by June 1 to Mrs. D. A. Leonard, Chairman, Bursary Committee, Kinette Club of Edmonton, 7320 - 155 St., Edmonton, Alberta.

*The P.E.O. Memorial Scholarship in Social Work* of the value of $100 is offered by the P.E.O. Sisterhood, Edmonton Chapters, to a graduating woman student from The University of Alberta, who intends to pursue studies in social work. The scholarship will be awarded to a student who attains at least second-class standing in her final year and will be paid only when she produces satisfactory evidence of registration in a recognized course of social work.

Apply to the Administrator of Student Awards by June 1.

# 226 / GOVERNMENT FINANCIAL ASSISTANCE TO STUDENTS

## 226.1 / *Province of Alberta Assistance—Matriculants and Undergraduates*

### 226.1.1 / DEPARTMENT OF EDUCATION

Under the Students Assistance Act (The Queen Elizabeth Education Scholarship Fund) assistance in various forms is available to students at a university in Alberta.

This assistance is also available for attendance in a course of university level at a junior college which is affiliated with such a university, or at an approved college or university elsewhere.

Matriculants and undergraduates must be bona fide residents of Alberta. Applicants must be full-time day students in a regular academic session.

(1) *Province of Alberta Matriculation Scholarships.* Scholarships of $100 are provided for students entering university the first time who had a matriculation average of 80% or better.

For details, see Matriculation Awards, Section 222.2.

(2) *Province of Alberta Undergraduate Scholarships.* Scholarships of $100 are provided for undergraduates with an academic standing in the previous year of 80% (grade-point average 7.5) or better.

For details, see Undergraduate Awards, Section 223.22.

(3) *Grants and Loans.* These are available on a basis of financial need only. A loan may be granted either in conjunction with, or separately from, a grant. Provincial loans are repayable to the Provincial Government.

*Matriculants* must be admissible to an approved university or college. All matriculants entering university for the first time should apply to The Secretary, Students Assistance Board, Provincial Department of Education, Administration Building, Edmonton.

*Undergraduates* must have a previous year grade-point average of at least 4.0 for grants. Application from students attending The University of Alberta should be made to the Administrator of Student Awards, The University of Alberta, Edmonton.

*Students should note that it may take up to eight weeks to process applications and should plan their financing accordingly.*

(4) *Summer Session Loans.* Loans not exceeding $250, on a basis of financial need, are available to undergraduate students enrolled in one or more summer courses for credit towards the degree for which they are registered. Applicants must have been previously enrolled for at least one full academic year at a recognized university.

Apply on Summer Session Loan form to Secretary, Students Assistance Board, Department of Education, Edmonton. The application deadline is July 15, but applicants are urged to apply as early as possible following admission. About three weeks will be required for processing.

### 226.1.2 / DEPARTMENT OF HEALTH

*Dental Auxiliary Bursaries.* A limited number of bursaries are available for students enrolled in the Dental Auxiliary program. They cover tuition fees, a monthly living allowance and a small book allowance. In return for the bursaries the recipients must undertake to work in a Health Unit in Alberta for 2 years.

Apply to the Director, School of Dental Hygiene, at the date of registration.

### 226.1.3 / DEPARTMENT OF PROVINCIAL SECRETARY

Scholarships at various levels of study are available in Drama, Handicrafts, Librarianship, and Music (including Fine Arts, Psychology and Sociology). There are various application dates. For further information apply to Department of the Provincial Secretary, Cultural Development Branch 424, Centennial Bldg., Edmonton.

### 226.1.4 / DEPARTMENT OF YOUTH

The Department of Youth administers two programs of scholarships and bursaries in Physical Education, Athletics and Outdoor Education and in Recreation Administration.

Application date for the Provincial program is June 1.

Application date for the National Fitness and Amateur Sport program is June 1.

Application forms and information should be obtained from Recreation Branch, Provincial Department of Youth, C.N. Tower Bldg., Edmonton.

## 226.2 / *Province of Alberta Assistance—Graduate Students*

Under the Students Assistance Act (The Queen Elizabeth Education Scholarship Fund) assistance in various forms is available to students at a university in Alberta or in a graduate faculty of another approved university.

(1) *Province of Alberta Graduate Fellowships.* A number of fellowships of $4,200 each tenable only in Alberta.

For details, see Graduate Awards, Section 224.2.

(2) *Province of Alberta Graduate Scholarships.* A number of scholarships of $3,000 to $3,600 each tenable only in Alberta.

For details, see Graduate Awards, Section 224.2.

(3) *Grants and Loans.* Grants not exceeding $500 may be given dependent on the previous year's academic standing. Loans not exceeding $500 for single persons or $1,000 for married persons may be given either in conjunction with, or separately from, grants. Need must be established in all cases.

Application should be made early in the session on the Provincial Government form.

Students attending The University of Alberta should apply to the Administrator of Student Awards.

Students attending outside of Alberta should apply to the Secretary, Students Assistance Board, Dept. of Education, Edmonton, Alberta.

## 226.3 / *The Canada Student Loans Plan*

The Canada Student Loans Plan was inaugurated in September 1964. Under this plan full-time students are permitted to borrow, on a basis of financial need, up to the extent of $1,000 per academic session and an aggregate of $5,000. Applicants must be Canadian citizens or have landed immigrant status and have lived in Canada for at least a year and state an intention to live in Canada after graduation.

Students entering university for the first time should apply through the Students Assistance Board, Provincial Department of Education, Edmonton.

Undergraduate or graduate students attending The University of Alberta should apply through the Student Awards Office, Edmonton.

Students whose home residence is in another Province should apply through that Province.

The same application form covers both the Provincial Students Assistance Act and the Canada Student Loans Plan. Assistance may be given under one or other or both plans on the same application form.

# 227 / OTHER SOURCES OF FINANCIAL ASSISTANCE

*University Student Loan Fund*—Through the generosity of private donors the University has at its disposal a Loan Fund from which loans may be made to students attending The University of Alberta, who could not otherwise complete their studies. In special circumstances loans may also be considered for Alberta students taking courses at an institution of University level elsewhere. Applicants must be making satisfactory academic progress. Interest at 5% per annum will be charged on loans not repaid within six months.

Apply to Administrator of Student Awards, Edmonton.

*Terwillegar Memorial Fund*—This fund was established by Dr. Norman L. Terwillegar in memory of his only sons, Norman Allin, who was killed while serving with the British Navy, and William Robert, who served in the Royal Canadian Air Force and who died while attending Queen's University; both were former students of The University of Alberta.

The proceeds of the fund will be available to suitably qualified students in Medicine or Engineering in the form of loans, free of interest to the date of graduation. Application forms and further information may be obtained from the Deans of Medicine and Engineering.

*The Alberta Dental Association Student Loan Fund*—The Association has established a loan fund for undergraduate students in the Faculty of Dentistry.

Apply to the Office of the Dean of Dentistry.

*The American Dental Trade Association* has made available a sum of $700 annually to be issued as loans to students who have entered or are about to enter, the final year in the Faculty of Dentistry and who require financial assistance. Application should be made to the Dean.

*The Albert Strickler Memorial Loan Fund*—This fund, which is administered from Philadelphia, provides for loans up to $600 for students in the Faculty of Medicine. While this is not restricted to American citizens, it may be of particular interest to any such who are studying at this University. Apply to the office of the Dean of Medicine.

*Medical Class of '41 Loan Fund*—A fund has been established by the Medical class of '41 from which small loans may be made at the discretion of the Dean of Medicine. Inquiries should be made at the office of the Dean of Medicine.

*Kellogg Foundation Fund Loans*—Through the generosity of the Kellogg Foundation of Battle Creek, Michigan, a sum of money has been made available to serve as a revolving fund to provide a limited number of loans to needy students in Medicine or Dentistry. For particulars in regard to these, apply to the Dean of Medicine or Dentistry.

*The Maude Abbott Memorial Loan Fund.* This fund has been established by the Federation of Medical Women of Canada. Loans up to $350 per year are available to women medical students or first year internes. A loan up to $1,000 may be granted to a medical woman for postgraduate training.

Apply to Dr. Lucille Ellison, 1207 West 40th Avenue, Vancouver, B.C.

*Children of War Dead (Education Assistance) Act*—This act provides fees and monthly allowances for children of veterans whose death was attributable to military service. Enquiries should be directed to the nearest district office of the Department of Veterans' Affairs.

*R.C.A.F. Benevolent Fund*—The Royal Canadian Air Force Benevolent Fund has made provision for loans for the benefit of former R.C.A.F. personnel or their dependents. For information apply to Mr. A. L. Robertson, P.O. Box 640, Federal Building, Edmonton, or District Superintendent, Veterans' Welfare Services, Department of Veterans' Affairs, 1107 - 1st Street, S.W., Calgary.

*The P.E.O. Educational Loan Fund*—This is a project which makes loans available to qualified women. Loans are made for periods up to five years. The maximum loan to any student is $1,250. College seniors or graduate students may draw the full amount in one academic year. Undergraduate students may draw up to $625 for one year of study. Loans to students in summer school are limited to $400. The rate of interest is 4%. Applications for loans may be submitted and will be processed at any time during the year. Further information may be secured from the Administrator of Student Awards or Mrs. S. G. Davis, 9118 - 116 St., Edmonton.

*The Harry F. Bennett Educational Fund*—This loan fund has been established by members of the Engineering Institute of Canada in memory of the late Harry F. Bennett, M.E.I.C.

Loans from this fund are available to deserving students in the Faculty of Engineer-

ing who have successfully completed their first year and are in need of financial assistance. The maximum loan in any year is $250 and for all years $450.

Application forms and further information concerning this loan fund may be obtained from the Dean of Engineering.

*The Association of Professional Engineers of Alberta Student Loan Fund*—The Association has provided a fund from which loans may be made to students in Engineering, Geology or Geophysics. This fund is designed for emergency loans and generally students should have exhausted the other normal sources first.

Apply to the Dean of Engineering or the Head of the Department of Geology or of Physics.

# 228 / CANADIAN ARMED FORCES SUBSIDIZATION PLANS

## 228.1 / *Regular Officer Training Plan*

### 228.1.1 / GENERAL

(1) The Department of National Defence, through the Regular Officer Training Plan (ROTP), sponsors a programme of university education and leadership training for selected numbers of young men who have the potential to become officers of the Canadian Armed Forces. The admission standards are high but for those who qualify, the way is open to a challenging and rewarding career.

(2) Candidates with senior matriculation or who are university undergraduates taking suitable courses are eligible to apply for enrolment as officer cadets. Applications for general or honours courses in Arts, Science, Engineering and several other courses are considered. Up to date information on currently preferred and acceptable courses may be obtained at any Canadian Forces Recruiting Centre.

(3) Those who are already attending university when accepted for the ROTP continue their studies at the same university until graduation. During the summer months, they take full-time training at a military establishment along with officer cadets from other universities and from the Canadian Service Colleges.

(4) Under the ROTP, successful applicants are enrolled on a career basis, i.e. for an indefinite period of service, and thus are assured of all benefits accruing to Regular Force officers.

(5) In recognition of the subsidization which has been provided, release within four years of graduation will be considered only under special and unforeseen circumstances. For those who take aircrew training, the period of obligatory service is five years after aircrew qualification.

(6) To be eligible for continued financial assistance an officer cadet of the ROTP must maintain good standing academically and in military training. A cadet who fails a university year may be permitted to repeat the year at his own expense and, if successful, be reinstated.

(7) Officer cadets are commissioned and promoted to lieutenant effective the day of university graduation.

### 228.1.2 / FINANCIAL ASSISTANCE

(8) Tuition and other compulsory fees are paid by the Department of National Defence. Cadets also receive an annual allowance of $125 for the purchase of books and instruments.

(9) ROTP officer cadets are paid all year at the rate of $187 per month, increasing to $192 per month after three years. $85 per month is deducted for food and lodging while on summer service training.

(10) The value of full medical and dental care, military clothing and other additional benefits is not included above.

(11) Leave with full pay, normally 30 days or more per year is granted during free periods between academic and service training.

### 228.1.3 / ADMISSION REQUIREMENTS

(12) An applicant must have the following qualifications:

*Citizenship*—be a Canadian citizen or British subject resident in Canada with the status of landed immigrant.

*Marital Status*—be single and remain so until commissioned.

*Medical*—be medically fit for enrolment.

*Age*—have reached his sixteenth but not his twenty-first birthday on January 1 of the year of entrance if applying with senior matriculation.

### 228.1.4 / HOW TO APPLY

(13) Application should be made at any Canadian Forces Recruiting Centre. In Edmonton the address is 10177 - 104th Street.

## 228.2 / *Medical Officer Training Plan*

### 228.2.1 / GENERAL

(1) The Canadian Forces Medical Officer Training Plan (MOTP) provides for the subsidization of medical students during the final three years of university and the year of internship.

(2) Successful applicants are enrolled in the rank of Second Lieutenant and are promoted to Lieutenant at the beginning of the internship year.

(3) During the summer months, MOTP students receive military and medical training at the Canadian Forces Medical Training Centre, Borden, Ont. and at other selected establishments.

(4) On completion of internship, they are promoted to Captain and are required to serve a minimum period of three years full time duty. After 18 months of full time duty, they may apply for Permanent Commission status.

### 228.2.2 / FINANCIAL ASSISTANCE

(5) Tuition and other compulsory fees are paid by the Department of National Defence. MOTP students also receive a $125 annual allowance for books and instruments.

(6) Second Lieutenants are paid all year at the rate of $369 a month. Lieutenants receive $563 a month. The amount of $85 per month is deducted during periods when food and lodging are provided at a military establishment.

(7) Members also receive full medical and dental care, a substantial allowance for the initial purchase of uniforms and other benefits.

(8) Leave with full pay, normally 30 days or more each year, is granted during free periods between academic and service training.

### 228.2.3 / ADMISSION REQUIREMENTS

(9) Applicants must have the following qualifications:

*Academic*—must be registered in or academically acceptable for one of the last three years of the course in medicine at a Canadian university or in the year of internship.

*Citizenship*—be a Canadian citizen or British subject resident in Canada with the status of landed immigrant.

*Age*—have reached the eighteenth but not the twenty-seventh birthday on the date of application..

*Sex*—normally, males only are acceptable but female applicants may be considerde.

*Marital Status*—may be married or single.

*Medical*—meet the appropriate medical standards.

### 228.2.4 / HOW TO APPLY

(10) Application should be made at any Canadian Forces Recruiting Centre. In Edmonton, the address is 10177 - 104th Street.

## 228.3 / *Dental Officer Training Plan*

### 228.3.1 / GENERAL

(1) The Canadian Forces Dental Officer Training Plan (DOTP) provides for academic training of male Dental Students at public expense during all or part of their four years in the Faculty of Dentistry.

(2) Applicants are enrolled as Officer Cadets in the first year of dentistry, or as Second Lieutenants if in the second or subsequent years. Officer Cadets are promoted to Second Lieutenant at the beginning of their second year in the Faculty of Dentistry.

(3) During the first summer under the DOTP, students receive general military officer training. In subsequent summers they are given military and dental training at the Royal Canadian Dental Corps School, Borden, Ontario.

(4) Upon graduation, dental Second Lieutenants are promoted to Captain and are required to serve a minimum period of five years full time duty. After two and one-half years full time duty, they may apply for Permanent Commission status.

### 228.3.2 / FINANCIAL ASSISTANCE

(5) Tuition, compulsory fees and the cost of necessary dental instruments and supplies are paid by the Department of National Defence. Students also receive an annual allowance of $125 for the purchase of books.

(6) DOTP Officer Cadets are paid all year at the rate of $187 per month, Second Lieutenants receive $369 per month. The amount of $85 per month is deducted during periods when food and lodging are provided at a military establishment.

(7) Members also receive full medical and dental care, initial military clothing and other benefits.

(8) Leave with full pay, normally 30 days or more each year is granted during free periods between academic and service training.

### 228.3.3 / ADMISSION REQUIREMENTS

(9) An applicant must have the following qualifications:

*Academic*—be registered in or acceptable without condition in any of the last four years of a course in dentistry at a Canadian University.

*Citizenship*—be a Canadian citizen or British subject with the status of landed immigrant.

*Age*—have reached his seventeenth birthday on the date of application and be young enough to allow him to obtain his license to practice dentistry before the age of forty-two.

*Marital Status*—may be married or single.

*Medical*—meet the prescribed medical standards for dental officers.

### 228.3.4 / HOW TO APPLY

(10) Application should be made at any Canadian Forces Recruiting Centre. In Edmonton the address is 10177 - 104th Street.

*Athabasca Hall was The University of Alberta's first permanent building. Turning the first sod are the Honourable A. C. Rutherford, Premier of Alberta (holding the plow), and Dr. H. M. Tory, first President of the University (on his left).*

# General Information

## 241 / HISTORICAL SKETCH

### 241.1 / *Introductory*

The University of Alberta is a publicly-supported, co-educational institution, sharing with the Universities of Calgary and Lethbridge the sole right of conferring degrees, other than degrees in Divinity, within the Province of Alberta. It is a member of the Association of Commonwealth Universities, of the Association of Universities and Colleges of Canada, and of the International Association of Universities.

The University possesses 878 acres of land, of which 154 acres constitute the campus and 724 acres the University Farm. Additional land is gradually being acquired. The campus borders the wooded southern bank of the North Saskatchewan River, about two miles from the business centre of Edmonton. On the campus are located some sixteen major teaching and research buildings, as well as two affiliated colleges, four halls of residence, the Students' Union, and service buildings. Adjoining are the Research Council of Alberta, the Provincial Laboratory of Public Health, two teaching hospitals, and the Northern Alberta Jubilee Auditorium.

### 241.2 / *The Beginnings of the University*

Alberta became a province in 1905. In 1906 the first session of her legislature passed an act to authorize the establishment of The University of Alberta. The act's sponsor was Alexander Cameron Rutherford, Alberta's first Premier and first Minister of Education. His government purchased the site in what was then Strathcona, and Dr. Rutherford himself persuaded Henry Marshall Tory to leave McGill to become the University's first President, an office he held from 1908 to 1928.

The Act permitted all resident graduates of British and Canadian universities to register as members of Convocation. Convocation elected five members to a Senate; the government appointed ten more. The Senate, acting as the governing body of the University, established the Faculty of Arts and Science as the core of the new institution. In 1910 a revision of the *University Act* constituted the Board of Governors, with powers of business management and administration.

Classes opened in September, 1908, in what is now Queen Alexandra School with forty-five students and a faculty of five: W. H. Alexander, Classics; E. K. Broadus, English; W. M. Edwards, Mathematics; L. H. Alexander, Modern Languages; and Dr. Tory himself. Thence they moved to the upper floor of Strathcona Collegiate Institute and then in 1911 to Athabasca Hall. Athabasca not only served as residence for staff and students, but also accommodated classrooms, laboratories, the library, the gymnasium and the administrative offices. The members of the first graduating class received their degrees at the Convocation of 1912, with Mr. Justice C. A. Stuart presiding as Chancellor.

A period of rapid growth followed, with registration reaching 439 in 1914. Assiniboia Hall was completed in 1913, Pembina Hall in 1914, and the Arts Building was formally opened in 1915. The Faculty of Law had its beginning in 1912. In the same year the Department of Extension initiated its work of promoting a closer relationship between the University and the people of the province. In 1913 the Faculty of Applied Science (in 1948 renamed Engineering) and the Faculty of Medicine were instituted, the latter able to offer three years of a five-year program.

The Students' Union was established during the first session and the first edition of *The Gateway*, the students' newspaper, appeared in 1911. The Committee on Student Affairs began in 1912 as a joint committee of students and University officials to exercise general supervision over matters affecting student welfare and discipline. Today the Council on Student Affairs carries on its work.

## 241.3 / *Years of Challenge: 1914 to 1945*

The outbreak of war in 1914 slowed the pace of development. The new University sent 438 of its staff, alumni, and students to the armed forces. Eighty-two were killed or died on active service. Their names, together with those of the casualties of the war of 1939-45, are commemorated on a bronze tablet near the entrance to Convocation Hall and by the Memorial Organ installed in 1923.

Although the war brought a halt to the building activity, the organization of the University's teaching moved on with the establishment of the Faculty of Agriculture in 1915, the School of Accounting (later the Faculty of Commerce) in 1916, the School of Pharmacy and the sub-faculty of Dentistry in 1917 and the Department of Household Economics in 1918.

With the end of the Great War the University rapidly expanded in number of students and staff. New laboratory facilities were built adjacent to the Arts Building, and the Medical Building was completed in 1921 in the form it had until new wings were added following the war of 1939-45. The curriculum was fundamentally revised in 1919-20 to permit greater freedom in election of courses. The first summer session was held in 1919. The institution of the Research Council of Alberta signified not only an increasing emphasis on science, but a further recognition of the University's involvement in the development of the province. In 1927 St. Joseph's College was opened under Roman Catholic auspices. St. Stephen's College had, as Alberta College South, been the first building on the campus. It was renamed in 1927 after the union of the Methodist and Presbyterian churches and became the United Church theological college for Alberta.

The depression years brought serious problems. Though registration did not decline, its increase was painfully slow, from 1,560 students in 1929 to 2,327 in 1939. Full-time teaching staff increased even more slowly. The budget actually fell and did not recover to its pre-depression level until after the war. No new building took place after the present Corbett Hall was completed. (Corbett Hall was originally constructed as a provincial normal school, not a University building.) Dr. R. C. Wallace succeeded President Tory in 1928, and in 1936 was followed by Dr. W. A. R. Kerr, who had been the first Dean of the Faculty of Arts and Science. The affiliation of Mount Royal College in 1931 marked a new beginning of university work in Calgary. The Banff School of Fine Arts opened in 1933 and the Western Board of Music was established in 1931. Entrance to the University from Grade XI was abolished in 1937. In 1930 fraternities were permitted; a less controversial change was the abolition of the old practices involved in freshman initiation.

The impact of the war of 1939 was very different from that of 1914-18. Though war naturally disrupted the University's life, there was a determination to preserve its essential being while using its facilities as fully as possible in relation to the national effort. The Air Force took over the three residences and out-of-town students, whose number had not substantially declined, flocked into Garneau boarding houses and made use of a new cafeteria, known to later generations as Hot Caf. Medicine, Dentistry, and Education offered accelerated courses. Engineering offered special courses to members of the armed services. No more important development took place than the acceptance in 1945 by the University of sole responsibility for the training of Alberta teachers. The School of Education, established in 1928, became a faculty in 1942, and after the war it became, in terms of enrolment, the largest in the University.

Dr. Robert Newton was named President on Dr. Kerr's retirement in 1941. He played an important part in the framing of the *University Act* of 1942, which transferred from the Senate to the General Faculty Council jurisdiction over academic matters and vested all final authority in the Board of Governors, whose jurisdiction had previously been confined to finance. No major changes in the University's constitution occurred until the *Act* of 1966 provided for the establishment of other and separate provincial universities under a Universities' Commission.

## 241.4 / *Years of Expansion: 1945 to 1968*

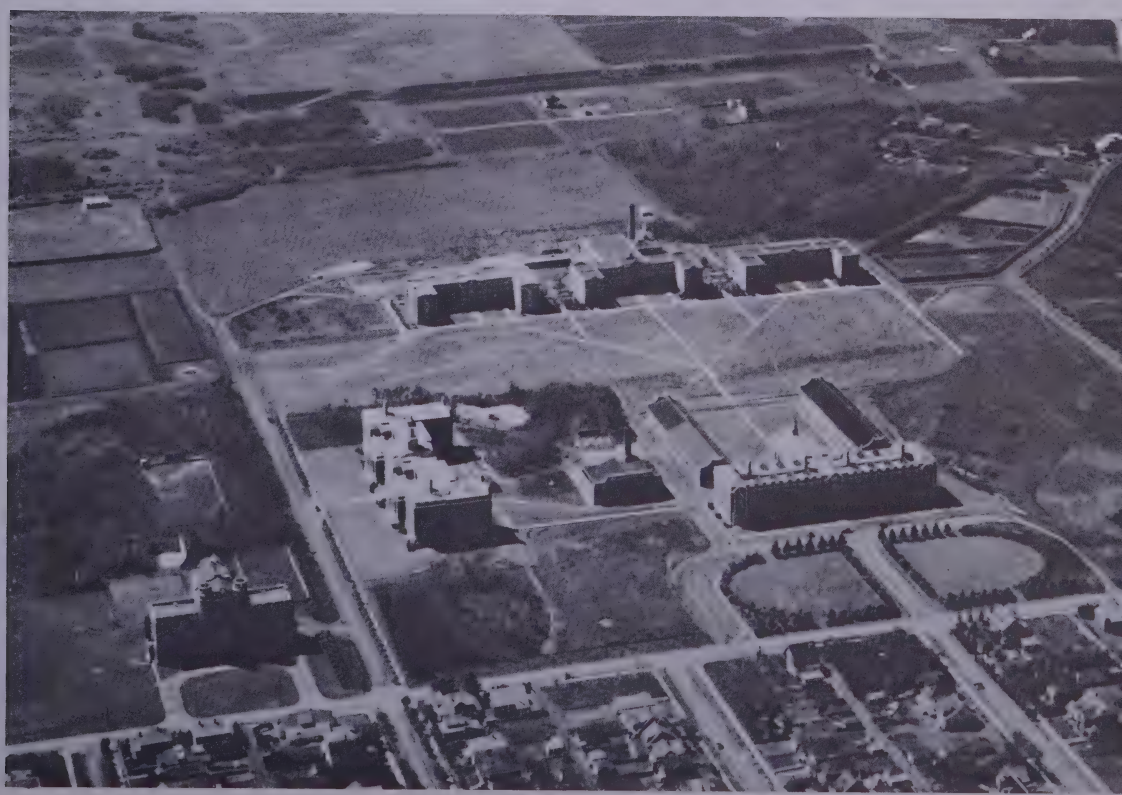
With the end of the war, a flood of veterans poured into the University and registration rose from 2,023 in 1943-44 to a peak of nearly 7,000 in 1947-48. Accommodation in classrooms, laboratories, and libraries was pathetically inadequate, and housing was generally even less satisfactory. Army huts only partially relieved the pressure. While by 1947 student numbers had tripled from pre-war figures, the full time teaching staff did not even double. Thereafter the pace of campus development slow-

ly increased. New wings were added to the Medical Building in 1947 and 1948; the Students' Union Building opened in 1950; the Rutherford Library and the Engineering Building in 1951; and the Agriculture Building in 1953 (it was enlarged in 1958 to become the Biological Sciences Building). The Administration Building dates from 1957.

The hectic post-war years merged into the slower growth of the 1950's. Dr. Andrew Stewart became President in 1951 and was succeeded by Dr. Walter H. Johns in 1959. Old institutions like *The Gateway, Evergreen and Gold,* and the Students' Union flourished and new ones like the Mixed Chorus, the Freshman Introduction Week and Varsity Guest Weekend developed. The University's work in Calgary, instituted in 1951, gradually expanded and an affiliated junior college was established in Lethbridge. These became separate universities in 1966. Student Counselling Services supplemented the Student Health Service, the latter almost as old as the University. The establishment of Graduate Studies as a Faculty in 1957 marked a new and important emphasis on this aspect of the academic program. The growing complexity of the University's offerings led to the separation of Faculties of Arts and Science in 1963.

The expected increase in numbers as the post-war generation came to university age brought an expanded building program in the 1960's. The Physical Education Building, the Physical Sciences Building and additions to the Medical and Engineering Buildings were followed by the Education Building, the Donald Ewing Cameron Library, the Household Economics Building, and the residences, where the dining centre was named in honor of Reg Lister, who had for so many years taken care of the older residences. The Henry Marshall Tory Building was opened in 1966. In the same year The University of Calgary became fully autonomous.

Growth in student numbers is reflected in the continuing building program, including the new Engineering and Biological Sciences Buildings, and in the expansion of the University into North Garneau, where many houses had already been taken over for University use. The University Farm provided a site for married students' housing. Late in 1965 a beginning was made on the new Students' Union building, which was opened in 1967. The contrast with its nearby predecessor, opened only fifteen years before, symbolizes the growth of The University of Alberta in the post-war years.



*The campus in the early 1920's: it was to remain almost unchanged for 25 years.*

*Administration Building*

## 242.1 / *Introductory*

The main lines of the constitution of The University of Alberta are laid down in *The Universities Act,* assented to April 15, 1966. The following section is a summary of some of its provisions.

## 242.2 / *The Universities Commission*

*Chairman*
A. STEWART, Ph.D.

*Ex-Officio Members*
T. C. BYRNE, Ed.D.
F. G. STEWART, Esq.

*Appointed Members*
G. L. BURTON, Ph.D.
His Honour Judge A. J. CULLEN, LL.B.
C. M. MACLEOD, Ph.D.
H. G. THOMSON, B.Com.
M. E. WOLFE, B.A.

The Universities Commission of the Province of Alberta consists of a Chairman appointed by the Lieutenant-Governor in Council, the Deputy Minister of Education, the Deputy Provincial Treasurer, and six other persons appointed by the Lieutenant-Governor in Council.

Its duties include inquiring into the financial needs of the Universities of the Province, advising the government with regard to the granting of financial assistance for university purposes, and acting as an intermediary between the government and the Universities and among the Universities.

## 242.3 / *The Co-ordinating Council*

### 242.3.1 / REPRESENTATIVES OF THE UNIVERSITY OF ALBERTA

*President*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Vice-President*
M. WYMAN, Ph.D.

*Other Representatives*
E. J. H. GREENE, D.U.
A. G. McCALLA, Ph.D.
M. A. NAY, Ph.D.
D. M. ROSS, Sc.D.
Two to be appointed

### 242.3.2 / REPRESENTATIVES OF THE UNIVERSITY OF CALGARY

*President*
To be appointed

*Vice-President*
W. R. TROST, Ph.D.

*Other Representatives*
J. B. HYNE, Ph.D.
J. G. NELSON, Ph.D.
B. G. WILSON, Ph.D.
J. G. WOODSWORTH, Ed.D.
Two to be appointed

### 242.3.3 / REPRESENTATIVES OF THE UNIVERSITY OF LETHBRIDGE

*President*
W. A. S. SMITH, Ph.D.

*Vice-President*
W. E. BECKEL, Ph.D.

*Other Representatives*
W. J. COUSINS, M.A.
O. G. HOLMES, Ph.D.
R. J. LESKIW, D.Ed.
E. R. V. MILTON, Ph.D.
M. J. PENTON, Ph.D.
G. B. WAGENAAR, PhD.

### 242.3.4 / SECRETARY

G. SAMUEL, M.A., Administrator of Professional Examinations

### 242.3.5 / GENERAL INFORMATION

The Universities' Co-ordinating Council consists of the following representatives of each University in Alberta: the President, the Academic Vice-President, two Deans and two other members of the academic staff appointed by the General Faculty Council, and not more than three other members of the academic staff appointed by the Co-ordinating Council itself. In even-numbered years, the Chairman is the President of The University of Alberta or his nominee; in odd-numbered years, the Chairman is the President of The University of Calgary or his nominee. The Council may appoint a secretary and prescribe his powers, functions, and duties.

The Council inquires into any matter that in its opinion calls for co-operative action on the part of the General Faculty Councils, and makes recommendations thereon to any General Faculty Council. Upon the request of a General Faculty Council, it may give its advice and opinions on any matter. It may make recommendations to the Board of Governors of a University. It may determine minimum standards for the affiliation of colleges or other institutions with the Universities, and may recommend that an affiliation agreement be made, modified, or dissolved. It gives or withholds its ap-

proval of standards or policies proposed by a General Faculty Council with regard to the admission of first-year students to any University. It has jurisdiction over the conditions of entrance to certain learned professions and callings.

## 242.4 / *The Visitor*

*Visitor of the University*
The Honourable J. W. G. MacEWAN, M.Sc., LL.D., Lieutenant-Governor of Alberta.

The Lieutenant-Governor of the Province, as the representative of Her Majesty the Queen in right of the Province, is *ex officio* Visitor of the University.

## 242.5 / *The Chancellor*

*Chancellor of the University*
F. P. GALBRAITH, LL.D.

The Chancellor is elected for a term of four years by the Senate. He is chairman of the Senate, confers all degrees, and is *ex officio* a member of the Board of Governors.

## 242.6 / *The President and Vice-Chancellor*

*President and Vice-Chancellor*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

The President, who is also the Vice-Chancellor is *ex officio* a member of the Co-Ordinating Council, the Board of Governors, the Senate, and all faculty councils. He presides at meetings of the General Faculty Council, and at his discretion he may call, and preside at, joint meetings of academic councils. He makes recommendations to the Board of Governors with respect to all appointments, promotions, and removals of members of the academic staff; and he is entrusted with the general supervision of the academic work and business affairs of the University.

## 242.7 / *The Vice-Presidents*

*Academic Vice-President*
M. WYMAN, Ph.D., F.R.S.C.

*Vice-President, Finance and Administration*
D. G. TYNDALL, Ph.D.

*Vice-President, Campus Planning and Development*
W. H. WORTH, Ed.D.

The Academic Vice-President is the senior vice-president. In the absence or incapacity of the President or when the presidency is vacant, he is the acting president. He is *ex officio* a member of the Co-ordinating Council of the Universities, and of the Senate.

## 242.8 / *The Board of Governors*

*Chairman*
J. E. BRADLEY, M.D.

*Statutory Members*
F. P. GALBRAITH, LL.D., Chancellor of the University
W. H. JOHNS, Ph.D., LL.D., D. ès L., President of the University

*Representatives of the Alumni Association*
His Honour Judge B. C. WHITTAKER, LL.B.
G. ROSS, Esq.

*Representative of the Senate*
G. L. ROPER, Esq.

*Representatives of the Academic Staff*
H. KREISEL, Ph.D.
E. J. HANSON, Ph.D.

*Other Appointed Members*
R. K. BANISTER, Esq.
L. A. DESROCHERS, LL.B.
E. R. LEWIS, Esq.
L. MAYNARD, LL.B.
(Mrs.) M. L. McCULLOUGH
D. K. YORATH, Esq.

The Board of Governors is a corporation with the name "Governors of The University of Alberta". It consists of a Chairman appointed by the Lieutenant-Governor in Council, the Chancellor, the President, and eleven other persons appointed by the Lieutenant-Governor in Council. Of the eleven, two are members of the Alumni Association nominated by the Association; one is a member of the Senate, nominated by it from those of its members who are not on the University staff; and two are members of the academic staff nominated by the General Faculty Council.

The conduct, management, and control of the University and all its property, revenue, business, and affairs are vested in the Board.

The Board appoints the deans of all faculties, all members of the teaching staff, the Librarian, the Registrar, and all members of the administrative staff, but no-one may be appointed to a senior administrative post or to the academic staff of the University unless first nominated by the President of the University. The board provides for the maintenance of buildings and the erection of new buildings. It has authority to purchase and acquire such property as it may deem necessary for the purposes of the University. It fixes the various fees charged in connection with university courses and it makes financial provision for the establishment of new faculties, departments, and courses. It may establish arrangements designed to contribute to the educational and cultural advancement of the people of Alberta at large. When any question arises as to the powers or duties of the Senate or any other University body or of the President or a Dean or other officer or employee, and these powers and duties are not definitely provided for in *The Universities Act,* the Board's decision on the question is final.

## 242.9 / *The Senate*

### 242.7.1 / EX-OFFICIO MEMBERS

*Chancellor of the University*
F. P. GALBRAITH, LL.D.

*President of the University*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Academic Vice-President*
M. WYMAN, Ph.D., F.R.S.C.

*Provost*
A. A. RYAN, M.A.

*Director of Extension*
D. D. CAMPBELL, M.A.

*President of the Alumni Association*
His Honour Judge B. C. WHITTAKER, LL.B.

*Vice-President of the Alumni Association*
D. C. RITCHIE, M.D.

### 242.7.2 / APPOINTED MEMBERS

*Appointed by the Deans' Council*
H. T. COUTTS
W. C. MacKENZIE

*Appointed by the Board of Governors*
E. R. LEWIS
(Mrs.) D. McCULLOCK

*Appointed by General Faculty Council*
H. B. COLLIER
(Miss) R. E. McCLURE
L. H. THOMAS

*Appointed by the Alumni Association*
(Mrs.) W. B. PARSONS
A. A. GUITARD

*Appointed by the Universities Commission*
R. W. CHAPMAN
P. G. DAVIES
H. A. MacNEIL
E. G. WAHLSTROM
R. J. ZENDER

*Appointed by the Students' Council*
(Miss) M. PILKINGTON
R. A. WATSON

### 242.7.3 / ELECTED MEMBERS

P. F. BARGEN
J. M. BENTLEY
F. C. BODIE
J. D. BRACCO
(Miss) A. CARMICHAEL
M. W. CORMACK
D. I. CROSSLEY
N. F. DUNCAN
R. J. EDGAR
L. GAREAU
M. W. HOWEY
W. H. JACKSON
F. T. JENNER
L. D'ALBERTANSON
A. B. KING
(Reverend) A. LACERTE
R. P. LANE
N. LEATHERDALE
S. H. McCUAIG
(Mrs.) I. McINTOSH
A. D. McTAVISH
(Mrs.) J. D. MANNING
(Reverend) R. M. MONTAGUE
L. S. OLSON
P. RAFFA
G. L. ROPER
H. SANDGATHE
W. A. B. SAUNDERS
(Mrs.) H. D. SIMONSON
(Reverend) E. J. THOMPSON
(Reverend) G. M. TUTTLE

### 242.7.4 / SECRETARY

*Registrar of the University*
A. D. CAIRNS, B.A.

The Senate of the University consists of the Chancellor, who is chairman; the President; the academic Vice-President; the Provost; the Director of Extension; the president and the vice-president of the Alumni Association; two deans, appointed by the Deans' Council; two members of the Board appointed by the Board; three members of the General Faculty Council, appointed by the Council; two members of the Alumni Association, appointed by the Association; five members of the public, appointed by the Universities Commission; two students, appointed by the Students' Council; and thirty representative members, to be elected by the *ex officio* and appointed members to represent affiliated colleges or institutions, geographical areas, and groups and organizations with an interest in the University.

It is the duty of the Senate to inquire into any matter that might tend to enhance the usefulness of the University. It is specifically authorized to require reports from faculty

and school councils, the Students' Council, and any members of the academic staff; to receive and consider submissions from anyone interested in the university; to arrange for public meetings, radio and television programs, and other means of providing and acquiring information on the University; as a consequence, to make reports and recommendations to the Board or the General Faculty Council or the Universities Commission or the Co-ordinating Council. It may authorize the conferring of honorary degrees.

## 242.10 / *The General Faculty Council*

### 242.10.1 / EX-OFFICIO MEMBERS

*President*
W. H. JOHNS, Ph.D., LL.D., D. ès L.

*Vice-Presidents*
M. WYMAN, Ph.D.
D. G. TYNDALL, Ph.D.
W. H. WORTH, Ed.D.

*Deans*
C. F. BENTLEY, Ph.D. (to Summer 1968)
H. T. COUTTS, Ph.D.
R. M. HARDY, D.Sc.
L. C. LEITCH, M.B.A. (Acting Dean)
A. G. McCALLA, Ph.D.
W. C. MacKENZIE, M.D., LL.D.
H. R. MacLEAN, D.D.S.
D. M. ROSS, Ph.D., Sc.D.
D. E. SMITH, Ph.D.
A. R. THOMPSON, LL.M. (Acting Dean)
M. L. VAN VLIET, Ed.D.

*Directors*
(Miss) E. L. EMPEY, Ph.D.
(Miss) R. E. McCLURE, M.P.H.
(Mrs.) M. B. MacLEAN, B.Sc.
J. B. REDFORD, M.D.
(Miss) S. R. REED, M.A.

*Librarian to the University*
B. B. PEEL, B.L.S.

*Director of Extension*
D. D. CAMPBELL, M.A.

*Registrar of the University*
A. D. CAIRNS, B.A.

### 242.10.2 / ELECTED MEMBERS

L. G. ALLBON, A.O.T.
A. J. ANDERSON, Ph.D.
D. T. ANDERSON, B.C.L.
D. G. BELLOW, Ph.D.
R. T. BERG, Ph.D.
R. V. BLACKMORE, Ph.D.
R. J. BUCK, Ph.D.
D. G. CAMERON, Ph.D.
T. R. CARLTON, M.A.
H. B. COLLIER, Ph.D.
H. A. K. CHARLESWORTH, Ph.D.
R. A. DAVEY, B.A.
J. J. DELEHANTY, B.S.
D. C. FAIR, Ph.D.
R. S. FRASER, M.Sc.
R. FRUCHT, Ph.D.
V. GOURISHANKAR, Ph.D.
L. C. GRISDALE, M.D.
H. E. GUNNING, Ph.D.
(Miss) B. N. N. HARRINGTON, B.Nursing
W. E. HARRIS, Ph.D.
J. C. HOLMES, Ph.D.
S. M. HUNKA, Ph.D.
J. A. JACOBS, Ph.D.
R. D. LAURENSON, M.D.
J. G. MacGREGOR, Ph.D.
F. V. MacHARDY, Ph.D.
W. D. NEAL, Ed.D.
R. S. PATTERSON, M.Ed.
C. T. PEACOCKE, M.F.A.
W. PILKINGTON, M.A.
W. E. RAZZELL, Ph.D.
N. M. PURVIS, M.Ed.
E. REINHOLD, Ph.D.
D. B. ROBINSON, Ph.D.
T. ROLSTON, L.R.C.M.
J. R. ROYCE, Ph.D.
J. T. SAMPLE, Ph.D.
W. D. SMITH, Ed.D.
B. R. J. SPROULE, M.D.
W. N. STEWART, Ph.D.
H. TENNESSEN, Magister Artium
L. H. THOMAS, Ph.D.
C. B. WILLIAMS, Ph.D.
K. V. WILSON, Ph.D.
S. ZALIK, Ph.D.

### 242.10.3 / APPOINTED MEMBERS

D. G. FISHER, Ph.D.
J. W. GILLES, Ed.D.
E. J. HANSON, Ph.D.
H. KREISEL, Ph.D.
(Miss) M. PILKINGTON
P. PONTING
A. A. RYAN, M.A.
R. A. WATSON, B.A.

The General Faculty Council consists of the President, the Vice-Presidents, the Deans, the Directors of Schools, the Librarian, the Director of Extension, the Registrar, elected members representing the faculties and the schools that have school councils, and members appointed by the *ex officio* and elected members. The number of elected members is twice that of the *ex officio* and elected members. The General Faculty Council, subject to the authority of the Board of Governors, is the senior academic body of the University. It arranges timetables, approves courses and examination results, provides for the granting and conferring of degrees, and hears appeals by students and others from decisions of faculty councils. Subject to the approval of the Universities Co-ordinating Council in the case of first-year students, it determines standards and policies respecting admission of students. It may make recommendations to the Board on affiliation of other institutions and any other matter which it considers to be of interest to the University. It may authorize a school to have a council of the nature of a faculty council, and may withdraw the authorization. It has the general supervision of student affairs.

## 242.11 / *The Deans' Council*

The Deans' Council, consisting of the President, the Vice-Presidents, the Deans of all the faculties, and such other officers as the Council may designate, has advisory functions.

## 242.12 / *Faculty and School Councils*

Each faculty, except that of Graduate Studies, has a council consisting of the President, the Dean of the faculty, all full-time members of the academic staff of the faculty, a representative of each of the appropriate professional societies associated with the university appointed by the General Faculty Council on the recommendation of the society, and other persons appointed by the General Faculty Council on the recommendation of the faculty council. Each school so authorized by the General Faculty Council may have a similar council. The Council of the Faculty of Graduate Studies consists of the President, the Dean, and other persons appointed by the General Faculty Council.

Each faculty council, subject to the control of the General Faculty Council, arranges the courses of study falling within its jurisdiction and provides for the setting of examinations and for determining the results. It deals with admissions and withdrawals, and authorizes the granting of degrees in course in branches of learning within its jurisdiction.

## 242.13 / *Other Administrative Officers*

### 242.13.1 / ACADEMIC ADMINISTRATION

*Registrar*
A. D. CAIRNS, B.A.

*Associate Registrar*
L. P. MORGAN, B.A.

*Assistant Registrar and Admission Officer*
W. A. D. BURNS, B.A.

*Director of Summer Session and Evening Credit Program*
J. W. GILLES, Ed.D.

### 242.13.2 / STUDENT AFFAIRS

*Provost and Executive Assistant to the President*
A. A. RYAN, M.A.

*Dean of Men and Foreign Student Adviser*
R. C. W. HOOPER, Dip. R.M.C.

*Dean of Women*
(Miss) I. MUNROE, B.A.

*Director of Student Counselling Services*
A. J. B. HOUGH, M.A., L.Th.

*Director of Student Health Services*
J. F. ELLIOTT, M.D.

### 243.13.3 / BUSINESS OFFICES AND SERVICE DEPARTMENTS

*Bursar*
J. M. WHIDDEN, B.Com. (to September 1968)

*Comptroller*
M. A. ROUSELL, B. Com.

*Chief Accountant*
A. S. KNOWLER, B.Com.

*Director of Physical Plant*
R. E. PHILLIPS, B.Sc.

*Personnel Officer*
M. S. COOKE, B.S.A.

*Purchasing Agent*
E. F. HUNTER, B.Com.

*Director of Institutional Research and Systems*
W. B. McMINN, B.A.Sc.

*Director of Housing and Food Services*
D. BONE, B.A.

*Manager, University Bookstore*
J. CANFIELD, B.S.

*Publications Officer*
F. WILLIAM SAMIS, B.Comm.

*Co-ordinator of Printing Services*
J. R. T. GRANT

*Co-ordinator of Technical Services*
W. H. JOPLING, B.Sc.

*Director of Public Relations*
E. V. HAMULA, B.Sc.

*Alumni Secretary*
A. G. MARKLE, M.Ed.

### 242.13.4 / CAMPUS PLANNING AND DEVELOPMENT

*Director of Campus Development*
W. A. HILLER, B.Sc., P.Eng.

*Project Officer*
A. T. ROBERTSON, P.Eng.

*Engineering Officer*
J. F. HELME, P.Eng.

*Planning Officer*
W. J. WILLIAMSON, P.Eng.

*New Construction Officer*
N. A. PALLAS, P.Eng.

*Site Development Officer*
R. H. KNOWLES, M.Sc.

# 243 / UNIVERSITY LIBRARIES

## 243.1 / *Library Staff*

### 243.1.1 / ADMINISTRATIVE OFFICERS

*Librarian to the University*
B. B. PEEL, M.A., B.L.S.

*Associate Librarian*
G. G. TURNER, LL.B., B.L.S.

*Assistant Librarians*
D. NODEN, M.A., B.L.S. (Technical Services)
M. L. SHARMA, M.S.L.S. (Public Services)

*Co-ordinator of Systems Planning and Development*
N. W. JOHNSON, B.L.S.

### 243.1.2 / BOOK ORDER DEPARTMENT

*Book Order Librarian*
C. D. EMERY, B.A., A.L.A.

*First Assistant*
A. KANTAUTAS, M.L.S.

*Assistants*
G. GRLICA, M.L.S.
B. E. HOBBS, B.L.S.
(Mrs.) H. F. PALMER, B.L.S.
(Miss) G. L. VALLI, B.L.S.

### 243.1.3 / CATALOGUING DEPARTMENT

*Chief Cataloguer*

*First Assistants*
(Miss) Y. FENTON, B.A., A.L.A.
(Mrs.) C. LUPTON, B.L.S.

*Assistants*
(Miss) A. F. BIGGANE, B.L.S.
(Miss) T. B. BODAK, B.L.S.
(Mrs.) A. M. EIKELAND, A.M.L.S.
(Miss) E. A. FOX, B.L.S.
(Miss) M. J. HOWELL, B.L.S.
(Mrs.) M. JAMIESON, B.L.S.
(Mrs.) S. S. MANWARING, B.L.S.
(Mrs.) T. PAAP, B.L.S.
P. PRIDMORE, B.A., A.L.A.
(Mrs.) S. SUBBARAO, M.A., M.A. in L.S.
(Mrs.) L. G. WALKER, B.L.S.
(Miss) J. WU, M.A., M.L.S.

*Cameron Library*

### 243.1.4 / CIRCULATION DEPARTMENT

*Circulation Librarian*
(Miss) N. E. FREIFIELD, B.L.S.

*Assistant*
M. M. DUNCAN, B.L.S.

### 243.1.5 / PERIODICALS DEPARTMENT

*Periodicals Librarian*
E. G. OLSON, B.L.S.

*Assistants*
P. A. ROY, B.L.S.
(Mrs.) R. TSAI, M.A., M.L.S.

### 243.1.6 / RARE BOOKS DEPARTMENT

*Rare Books Librarian*
(Miss) D. I. HAMILTON, B.Sc. in L.S., A.M.L.S.

### 243.1.7 / REFERENCE DEPARTMENT

*Reference Librarian*
(Miss) M. V. AUXIER, B.L.S.

*Assistants*
W. HYRAK, D.Jur., B.L.S.
(Miss) F. MIELKE, B.L.S.
(Miss) J. P. THOMPSON, B.L.S.

### 243.1.8 / SELECTIONS DEPARTMENT

*Selections Librarian*
(Miss) L. E. M. LEVERSEDGE, B.L.S.

*Subject Specialists*
J. SHUMELDA, D.Jur., M.A., M.L.S.
C. N. SUCHOWERSKY, D.Jur. et Rer.Pol., M.L.S.

### 243.1.9 / SYSTEMS PLANNING & DEVELOPMENT DEPARTMENT

*Assistant*
C. D. SHARPLIN, B.L.S.

### 243.1.10 / EDUCATION LIBRARY

*Education Librarian*
(Mrs.) L. E. SAGER, M.L.S.

*Assistants*
J. K. CHENG, M.L.S.
M. JAHANGIR, M.A., M.A.L.S.
(Mrs.) S. E. ROONEY, B.L.S.

### 243.1.11 / GENERAL SCIENCES LIBRARY

*General Sciences Librarian*
(Mrs.) E. MacDONALD, B.L.S.

*First Assistant*
(Mrs.) I. RALETICH, B.L.S.

*Assistants*
(Mrs.) L. R. EINBLAU, B.L.S.
(Miss) A. L. SWANSON, B.L.S.

243.1.12 / LAW LIBRARY

*Law Librarian*
(Miss) P. J. COFFMAN, M.A.L.S., LL.M.

243.1.13 / MEDICAL SCIENCES LIBRARY

*Medical Sciences Librarian*
(Miss) P. RUSSELL, B.L.S.

*Assistants*
(Miss) K. L. MUNRO, B.L.S.

243.1.14 / UNDERGRADUATE LIBRARY

*Undergraduate Librarian*
(Mrs.) M. FARNELL, B.S. in L.S.

*First Assistant*
(Mrs.) H. J. BEDNARSKI, M.A., B.L.S.

*Assistant*
(Miss) A. S. TIPPIE, B.L.S.

243.1.15 / UNIVERSITY ARCHIVES

*University Archivist*
J. M. PARKER, M.A.

## 243.2 / *General Information*

The libraries of The University of Alberta contain over 700,000 volumes, some 220,000 government publications and a substantial collection of research materials in microform. The library system added nearly 120,000 volumes in 1967-68, special attention being given to the development of library resources in the humanities and social sciences. Periodical titles subscribed to in 1968 number 10,500; the current emphasis and the area of greatest strength in the periodical holdings is in science.

The main collection is housed in the six-storey Cameron Library which was opened in 1963; a wing is to be added in 1968-69. Library materials are arranged by subject on the upper floors.

The main floor is the information and service centre of the library. Here are found the Circulation Desk, the Union Catalogue, the Central Periodicals Record, the Bibliography Room, and the Reference Room. The lower floor contains special collections and special services including government publications, rare books, microform storage and readers, xerox and microfilm reproduction, along with a student lunch room. Senior undergraduates have open access to the Cameron Library stacks, and study accommodation is provided by both reading tables and carrells interspersed throughout the stacks. Graduate students may apply for a carrell in the Cameron Library. This entitles a student to share with another student the use of a carrell table during the session.

An undergraduate collection is provided in the Rutherford Library which also houses the Law Library and Extension Library. This basic collection of 40,000 volumes and 100 selected periodical titles is primarily for students in their first and second years. The books are shelved in open access around reading rooms on the second floor. There is a Reserve Reading Room on the first floor and a large study room on the ground floor.

Other libraries on the campus are the Education Library occupying the three-storey east wing of the Education Building, and the Physical Sciences Library (for chemistry and physics) in the Physical Sciences Building. The former houses a collection of over 80,000 volumes of books and periodicals, and the latter a collection of 12,000 and 4,000 volumes.

Library service is also offered by the following reading rooms: the library for Nursing, Rehabilitation Medicine, and Drama in Corbett Hall; The John W. Scott Library in the University Hospital for the use of clinical teaching staff and senior students; and the Physical Education Library in the Physical Education Building.

*Rutherford Library*

# 244 / RESEARCH CENTRES AND INSTITUTES

## 244.1 / *The Boreal Institute*

*Executive Director*
J. J. BOND, Ph.D.

*Directorate*
R. A. BURWASH, Ph.D. (Chairman)
G. E. BALL, Ph.D.
C. W. HOBART, Ph.D.
T. H. PATCHING, B.Sc.
W. C. WONDERS, Ph.D.

*Librarian*
(Mrs.) H. M. ROBINSON, A.L.A.

The purpose of the Boreal Institute is the acquisition and dissemination of knowledge of the northern regions of the world. It maintains a library and information centre at which existing material concerning the North, including literature, maps, and photographs, is collected and classified, and which provides a reference service and issues occasional publications. It encourages, co-ordinates, and administers research on the North. It offers instruction designed to prepare people to enter the North and deal with the problems peculiar to it, and attemps to reduce the problems of communication among the peoples of the North through improving the teaching of native languages and of English to native peoples. Inquiries regarding the work of the Institute should be addressed to the Director. Inquiries for information from the reference service should be addressed to the Librarian.

## 244.2 / *Cancer Research Institute*

See § 121.3.4 of the Faculty of Medicine section of the Calendar.

*Indian clothing and buffalo skull in the Boreal Institute's museum.*

## 244.3 / *Centre for Advanced Study in Theoretical Psychology*

*Director*
J. R. ROYCE, Ph.D.

*Academic Staff*
L. von BERTALANFFY, Ph.D.
W. W. ROZEBOOM, Ph.D.
H. TENNESSEN, Magister Artium
T. E. WECKOWICZ, Ph.D.
K. V. WILSON, Ph.D.

The Centre for Advanced Study in Theoretical Psychology brings together scholars from various disciplines to study the central concepts and logical structure of psychological theory. It sponsors a series of advanced seminars in theoretical psychology, with special emphasis on methodology and on the integration of the disciplines concerned with psychology. It also offers pre-doctoral assistantships and post-doctoral fellowships for research in theoretical psychology. Inquiries should be addressed to the Director of the Centre.

## 244.4 / *Centre for the Study of Mental Retardation*

*Associate Professor and Director*
D. R. CAMERON, M.Ed.

*Associate Professor*
J. P. DAS, Ph.D.

The Centre for the Study of Mental Retardation is a multi-disciplinary research institute sponsored jointly by The University of Alberta and the Canadian Association for Retarded Children. Its purposes are: (i) to encourage University staff and graduate students to collaborate in investigating problems related to mental retardation; (ii) to ensure adequate financing and services for approved research projects; and (iii) to publish and disseminate the findings of such research. It provides support for scientists conducting biomedical, psychosocial, and educational studies on the prevention of mental retardation and the treatment and education of mentally retarded children. Policy for the Centre is established by an inter-disciplinary Advisory Committee responsible to the President of the University.

## 244.5 / *Institute of Law Research and Reform*

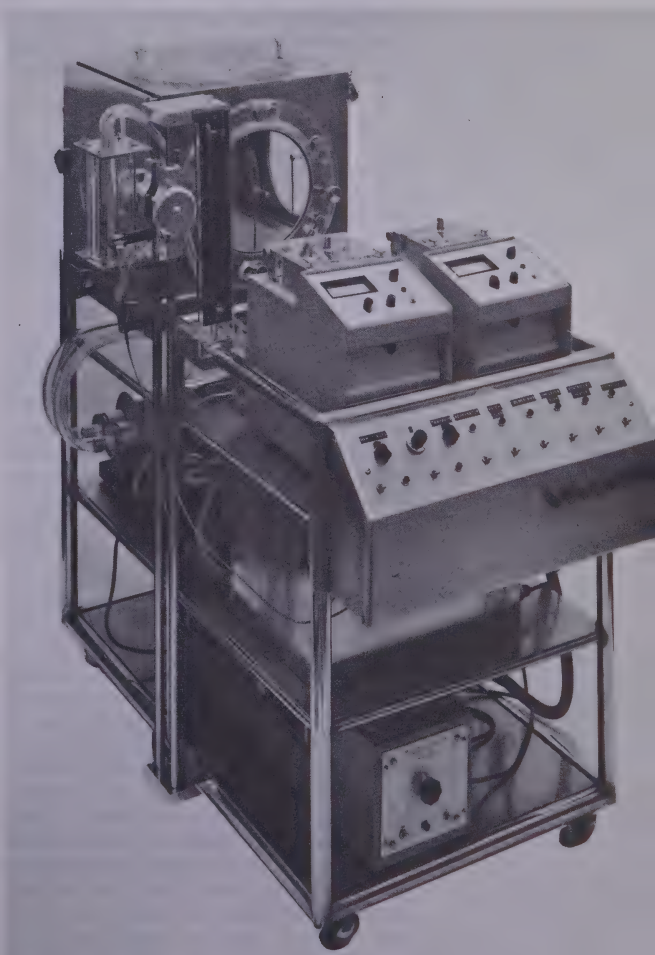
*Director*
W. F. BOWKER, LL.M., Q.C.

*Assistant to the Director*
G. R. BRETTEN, M.A., LL.B.

The Institute of Law Research and Reform was established in November, 1967, by agreement between the Provincial Government, the Law Society of Alberta, and the University. Its objects are twofold: to promote law reform, particularly at the provincial level, and to encourage legal research in co-operation with the Faculty of Law. As of June, 1968, the Institute had underway five projects for law reform and had awarded three research grants to faculty members.

## 244.6 / *Surgical-Medical Research Institute*

See § 121.3.3 of the Faculty of Medicine section of the Calendar.



*Organ perfusion apparatus designed and constructed by the Surgical Medical Research Institute, to study the physiology of isolated organs, and methods of preserving organs for transplantation.*

# 245 / DEPARTMENT OF EXTENSION

## 245.1 / *Introductory*

### 245.1.1 / MEMBERS OF THE DEPARTMENT

*Professor and Director of Extension*
D. D. CAMPBELL, M.A.

*Assistant Director*
C. M. LOCKWOOD, B.A.Sc.

*Associate Professors*
D. A. BANCROFT, M.A., M.P.A.
D. M. CATMUR, M.A., M.A.L.D.
G. A. EYFORD, M.A.
D. N. LITEPLO, B.Comm.
J. E. MULLOY, B.A., B.Comm., C.A.
H. W. ROBERTS, M.A.
J. A. SHAW, M.S.
W. H. STEWART, M.S.

*Assistant Professors*
D. D. BARRY, A.O.C.A.
A. M. ELLIOTT, M.P.H.
R. R. FARYON, M.B.A.
G. W. LAMBLE, M.Sc.
J. M. McDONALD, M.S.W.
H. WOHLFARTH, D.F.A., Hon. Ph.D.
G. H. WRIGHT, B.A.

*Sessional Instructors*
H. G. SAVAGE, Dip. in Art
J. P. VAN ALDERWEGEN, Nat'l. Dip. in Design

*Extension Librarian*
M. I. DODDS, M.S.

*Assistant Librarians*
M. L. ENGLISH, M.L.S.
E. I. McCALLUM, B.L.S., B.A.
E. I. SAVIC, B.L.S.

### 245.1.2 / GENERAL INFORMATION

The Department of Extension is one of the oldest institutions of the University, having been inaugurated in 1912. Its purpose is to bring the facilities of the University within the reach of every citizen of the Province.

## 245.2 / *Libraries*

### 245.2.1 / EXTENSION LIBRARY

The Extension Library provides a service to residents of Alberta who have no public library in their community. Its collection of 60,000 volumes is especially strong in the subjects of fine arts, community leadership, and business administration, and also includes recreational reading material for children and adults. Books are sent by parcel post to individuals and families, and in boxes of forty volumes to small libraries and community groups of all kinds. The Library has developed directed reading programs based on its resources which are available both to study groups and individuals.

In addition to this service, the Extension Library closely supports Extension courses in a wide variety of subjects, and provides an extensive general reference and information service, drawing on inter-library loan when necessary.

### 245.2.2 / EDUCATIONAL MEDIA DIVISION

The Visual Instruction Division maintains an Audio-Visual Library containing some 3,600 16 mm. films, 2,670 filmstrips, and more than 1,680 recordings, both disc and tape. A variety of projectors and recording playback equipment is available as well.

A visual communication laboratory within the Division makes possible the preparation of inexpensive visual materials for a variety of instructional purposes. It is intended to serve not only university and school teachers but also community groups, and it offers advice, demonstration, and instruction in the use of educational media.

The Division keeps an information reference file which gives data on the nature, availability, and uses of various types of educational media, and, in addition, on developments in educational television and programmed learning. This reference service is also designed to meet the needs both of teachers and of a wide variety of community groups.

The Division provides formal and informal courses in the techniques of audio-visual communication in Edmonton and throughout the Province.

## 245.3 / *Programs and Services*

### 245.3.1 / EVENING CLASSES, SHORT COURSES, AND CONFERENCES

The Department of Extension offers some three hundred non-credit courses to the Alberta public in a broad range of subjects in the humanities, the sciences, technology and business. The medium of instruction may be an evening or day class meeting once weekly, a seminar, conference, independent study or short course.

Short courses are relatively brief, lasting from three days to two weeks, but intensive. They are arranged to suit the particular needs and interests of professional, technical, and other groups throughout the province, and their content may be highly technical or of broad general interest.

The Department has, for many years, assisted community groups and voluntary

organizations throughout the province to arrange conferences, workshops, and seminars. Courses conducted in co-operation with rural and urban organizations have centred on such topics as leadership training, community development, and parliamentary procedure.

The development of a program in public affairs including evening classes, directed reading programs, and conferences, is a more recent addition to extension activities. The aim of this program is to increase the ability of adults to for msound, independent, and critical judgments on important issues of public policy.

The pattern of evening classes, short courses, and conferences is continually changing, as the Department strives to adapt its offerings to meet the changing needs of individuals and organizations throughout the province.

### 245.3.2 / PUBLIC ADMINISTRATION TRAINING DIVISION

The Public Administration Training Division offers certificate courses in Municipal Administration and Municipal Assessment of four years' duration. In addition, it is responsible for conference courses of three days' duration held annually at Banff. The needs of local government officers for special training are met by the Division through a combination of correspondence courses and tutorial sessions held at twelve selected centres throughout the province.

### 245.3.3 / FINE ARTS DIVISION

Part-time and full-time instructors in Painting, Ceramics, Sculpture, Music, and Drama offer a variety of courses in the program of continuing education in the Fine Arts at Edmonton. In addition, the Department conducts classes in Drawing and Painting at a number of centres throughout the province. Instructors of national and international reputation are invited to Edmonton to offer intensive short courses in Painting and Music during the summer.

### 245.3.4 / LIBERAL STUDIES DIVISION

This Division includes in its scope evening and day-time programs, short courses seminars, and workshops in the humanities, applied behavioral sciences, and public affairs. The aim of the Division is increasingly to bring all these aspects of knowledge together in an inter-disciplinary approach to adult education in the community. The Division is concerned with the development of new course and program patterns to suit the circumstances of collective and independent adult learners, in conjunction with Educational Media Division and the Extension Library. Members of the Division provide consultative and organizational service to other groups and institutions, urban and rural, engaged in or concerned with the liberal education of adults.

### 245.3.5 / RURAL DEVELOPMENT DIVISION

The role of this Division, stemming from some of the earliest work of the Extension Department in rural areas of the Province, is the development of leadership skills at all levels among rural people, and the provision of advanced courses in various aspects of agricultural technology. In particular, its responsibility is for provision of training in the techniques of community development. In this work the Division co-operates closely with Government departments, agricultural organizations in the Province, other universities in Western Canada, and other faculties in The University of Alberta. Members of the Division provide consultative service to groups particularly concerned with education and development in the rural areas.

### 245.3.6 / BUSINESS AND PROFESSIONAL DIVISION

This Divisions offers programs of continuing education which provide an opportunity for adults to refresh and update the knowledge they require to perform effectively in their vocations. The main thrust of the Division's work is in the area of management education and specialized programs of continuing education for various professional groups. This work is carried out through the initiating, developing and offering of courses leading to University Certificates, informal evening and daytime classes, seminars, and short courses—some residential in nature—many on the cutting edge of new research. The staff of the Division consults with members of the business and professional community to ascertain their needs for continuing education. At the same time it works closely with other members of the University faculty in order to develop programs which will, in the most effective way, meet these needs.

### 245.3.7 / INFORMATION SERVICES

The Extension Library provides a question-answering service for the public on topics of general interest. The Agricultural Supervisor answers innumberable questions on specialized topics received from all parts of the province, and distributes bulletins and other publications of interest to farmers. The Educational Media Division also maintains an answering service for questions concerned with audio-visual instruction.

# 246 / AFFILIATED COLLEGES

## 246.1 / *Introductory*

Two denominationally-sponsored colleges are related to the University by a form of agreement described as *affiliation,* and have buildings located on the University campus.

## 246.2 / *St. Stephen's College*

### 246.2.1 / ACADEMIC STAFF OF THE COLLEGE

*Principal and Professor of Christian Theology and Christian Education*
Rev. G. M. TUTTLE, Th.D.

*Dean and Professor of New Testament*
Rev. D. J. C. ELSON, D.D.

*Professor of Church History*
Rev. C. F. JOHNSTON, Th.D.

*Professor of Old Testament*
Rev. G. L. VOGAN, S.T.M.

*Professor of Christian Ethics*
Rev. T. R. ANDERSON, Th.D.

*Lecturer in Worship and Preaching*
Rev. B. D. MOORE, S.T.M.

*Lecturer in Counselling*
Rev. R. K. DOUGAN, B.D.

*Librarian*
(Mrs.) F. SCOFFIELD, B.D.

*St. Stephen's College Residence*

### 246.2.2 / GENERAL INFORMATION

St. Stephen's College is the theological school of the United Church of Canada which was affiliated with the University in 1909. Its residence accommodates 150 male students of all faculties. The Dean of Residence is Dr. C. F. Johnston.

### 246.2.3 / THE DEGREE OF BACHELOR OF DIVINITY

By arrangement with St. Stephen's College, The University of Alberta offers the degree of Bachelor of Divinity to students who have successfully completed a program of theological studies in the College.

Applicants for admission to the theological program should hold an acceptable degree in Arts, Science, or Education. They will be admitted in the first instance to a qualifying year. Formal admission to candidacy for the B.D. degree is contingent upon satisfactory completion of the qualifying year.

The program of study for the B.D. degree is prescribed by the College, subject to the approval of the General Faculty Council Committee on the Bachelor of Divinity Degree. The number of courses which may be taken extramurally in a winter session is restricted to two. In all courses taken toward the B.D. degree the pass mark is 65 per cent. No supplemental examinations are permitted.

For further information regarding this program, application should be made to the Registrar.

### 246.2.4 / COURSES OFFERED FOR UNIVERSITY CREDIT

By an arrangement with the University courses in Biblical Literature and Hebrew taught in St. Stephen's College are open to students of the University, counting for credit towards the Bachelor of Arts degree or as Arts options open to students in other faculties.

*Biblical Literature*

O & NTL 351. *Old and New Testament Literature.* ♦6 (3-0). Historical background, authorship, sources, literary qualities and general teaching of the various books and groups of books in the Old

Testament. Jewish literature subsequent to the Old Testament canon; the Jewish and Hellenistic environment; the occasion, authorship, and content of the various books of the New Testament; growth of the canon; history of the text.

*Hebrew*

HEBREW 100. *Elements of Hebrew.* ♦6 (3-2). Basic grammar of classical Hebrew and selected readings from the documents of the Pentateuch.

HEBREW 300. *Elements of Hebrew Syntax.* ♦6 (3-0). Basic grammar (continued) with a solid introduction to syntax sufficient to lead to graduate study. Readings from the Prophets and other writings of the Hebrew Bible. Prerequisite: Hebrew 100.

HEBREW 400. *Hebrew Syntax and Composition.* A seminar and reading course to be arranged with the Dean of St. Stephen's College. Prerequisite: Hebrew 100 and 300 (or their equivalent).

### 246.2.5 / GENERAL THEOLOGICAL STUDIES

In addition to the above, the College offers a wide range of theological courses—Biblical Literature, Church History, Church and Society, Christian Ethics, Contemporary Theology, Counselling—designed to prepare men and women for various professional ministries in the Church.

These courses are open equally to others whose level of training in Arts or Sciences is estimated by the Dean to be a sufficient prerequisite.

## 246.3 / *St. Joseph's College*

### 246.3.1 / ACADEMIC STAFF OF THE COLLEGE

*Rector, and Associate Professor of Philosophy*
R. M. MONTAGUE, CSB., M.A.

*Professor of Philosophy*
J. W. DORE, CSB., Ph.D.

*Assistant Professor of Economics*
R. A. PENDERGAST, CSB., Ph.D.

*Assistant Professor of Philosophy*
J. DALEY, CSB., M.A.

*Lecturer in Theology*
M. J. FALLONA, CSB., M.A.

### 246.3.2 / GENERAL INFORMATION

St. Joseph's College is established under the authority of the Roman Catholic Church, and directed by the Congregation of St. Basil (Basilian Fathers). It was affiliated with the University by resolution of the Senate, May 31, 1926.

### 246.3.3 / COURSES OFFERED FOR UNIVERSITY CREDIT

St. Joseph's College offers the following courses which may be taken by men and women students for credit towards University degrees:

*Christian Theology*

CHR 367. *Introduction to Christian Theology.* ♦6 (3-0). Emphasis on the contributions of Christian writers and theologians to the Christian theological heritage.

*Philosophy*

PHIL 242. *Foundations and Development of Christian Philosophy.* ♦6 (3-0). Main ideas and currents of Western philosophy from its beginnings in the creative period of Greek thought. Selected ideas and problems examined in the writings of significant Western philosophers. Note: Offered by St. Joseph's College as an alternative to Philosophy 240.

PHIL 330. *The Philosophy of Man.* ♦6 (3-0). A philosophical study of man in himself, in his operations of knowing and loving, in the perfection of his actions through the development of habits, and in his domestic, community, and political environments. Related readings from Plato, Aristotle, Augustine, Thomas Aquinas, Locke, J. S. Mill, Dewey, Maritain, Ryle, Austin, and others.

PHIL 346. *Medieval Philosophy.* ♦6 (3-0). Lectures and seminars, with readings from Augustine, Bonaventure, Thomas Aquinas, Duns Scotus, and William of Ockham. Consideration of Arabian and Jewish philosophy. Prerequisite: Philosophy 240 or 242.

PHIL 506. *St. Thomas Aquinas.* ♦6 (3-0). Note: Open only to graduate students.

*St. Joseph's College*

# 247 / OTHER AFFILIATED AND ASSOCIATED INSTITUTIONS

## 247.1 / *Junior Colleges*

Four junior colleges in Northern Alberta are related to The University of Alberta by affiliation agreements under which certain courses offered by the colleges will be accepted for university credit. These colleges are: Camrose Lutheran College; the Collège St-Jean, Edmonton; Grande Prairie Junior College and Red Deer Junior College.

The terms and conditions for the affiliation of junior colleges are currently (June, 1968) under review. Further information should be sought directly from the junior colleges.

## 247.2 / *The Provincial Laboratory of Public Health*

*Provincial Bacteriologist and Director*
J. M. S. DIXON, B.Ch., M.D.

*Director, Southern Branch (Calgary)*
D. SHUTE, Ch.B., M.D.

*Provincial Pathologist*
J. W. MACGREGOR, M.D.

*Deputy Director (Edmonton)*
C. H. JELLARD, B.M., B.Ch.

*Consultant Bacteriologist*
F. L. JACKSON, M.B., B.S.

*Virologist*
(Miss) O. MORGANTE, M.D., Ph.D.

*Senior Assistant Bacteriologist*
(Miss) S. R. TOSCHACH, M.A.

*Assistant Bacteriologists*
(Mrs.) A. M. BURSEWICZ, M.B., Ch.B.
(Miss) Y. GOODMAN, M.Sc.

*Assistant Pathologists*
G. O. BAIN, M.D.
T. A. KASPER, M.D.
B. MIELKE, M.D.
T. K. SCHNITKA, M.Sc., M.D.
R. J. SWALLOW, M.D.

*Specialist in Mycology*
J. W. CARMICHAEL, Ph.D.

*Associate in Bacteriology*
I. W. GEERE, M.B., Ch.B.

The Provincial Laboratory of Public Health as branches both at Calgary and Edmonton. The Edmonton branch is administered by The University of Alberta, and its senior staff members are also members of University departments and conduct certain University courses within the Laboratory.

## 247.3 / *The Research Council of Alberta*

### 247.3.1. / ADMINISTRATIVE OFFICERS

*Director*
E. J. WIGGINS, Ph.D.

*Administrative Assistant to the Director*
W. K. IRWIN, B.A.

### 247.3.2 / FUELS BRANCH

*Chief, Fuels Branch, and Head, Natural Gas Division*
H. W. HABGOOD, Ph.D.

*Head, Coal Division*
N. BERKOWITZ, Ph.D.

*Head, Petroleum Division*
To be appointed

*Head, Product Research and Development Division*
S. M. CREIGHTON, Ph.D.

*Head, Special Projects and Microbiology Division*
R. M. ELOFSON, Ph.D.

*Head, Gas and Oil Testing Laboratory*
J. S. CHARLESWORTH, B.A.

### 247.3.3 / EARTH SCIENCES BRANCH

*Chief, Earth Sciences Branch*
R. GREEN, Ph.D.

*Head, Geology Division*
G. B. MELLON, Ph.D.

*Head, Groundwater Division*
J. TOTH, Ph.D.

*Head, Soils Division*
W. ODYNSKY, M.Sc.

### 247.3.4. / OTHER RESEARCH DIVISIONS

*Head, Highways Research Division*
B. P. SHIELDS, M.Sc.

*Head, Industrial Engineering Services Division*
J. GREGORY, M.Sc.

*Head, Cloud Physics and Hail Division*
P. W. SUMMERS, Ph.D.

### 247.3.5 / GENERAL INFORMATION

The Research Council of Alberta was originally formed in 1919 by the Province and the University for the general purpose of conducting economic research into the natural resources of the Province. For many years it was housed in University buildings and it is still located on the campus. The President of the University is a member of the Council.

Further information about the staff and work of the Council may be obtained directly from the Council.

## 247.4 / *The University of Alberta Hospital*

*Members of the Hospital Board*

G. K. WYNN, Esq. (Chairman)
E. A. D. McCUAIG, Esq. (Vice-Chairman)
(Mrs.) W. F. BOWKER, LL.D.
E. A. CHRISTENSON, Esq.
K. J. HAWKINS, Esq.
W. H. JOHNS, Ph.D., D. ès L., President of the University
W. C. MacKENZIE, M.D., LL.D., Dean of the Faculty of Medicine
M. R. PARKER, Esq.
J. E. YOUNG, M.D.

*Medical Superintendent*

B. SNELL, M.D.

*Secretary of the Hospital Board*

G. C. SHERWOOD, Esq.

The University of Alberta Hospital was administered by the University from 1922 to 1929. It is now administered by a board appointed by the Lieutenant-Governor in Council, including the President of the University and the Dean of the Faculty of Medicine as statutory members. The hospital has a bed capacity of approximately 1,200. Students in Medicine, Dentistry, and Nursing receive instruction there.

## 247.5 / *The Western Board of Music*

The Western Board of Music was founded in 1935 in order to conduct examinations of a high standard in music. In it are associated the Universities and the Departments of Education of Alberta, Manitoba, and Saskatchewan. The organization in Alberta is under the University Committee on Music.

The University of Alberta awards the diplomas of A.Mus. (Alberta) and L.Mus. (Alberta) for the second-highest and highest grades, respectively, in the Western Board examinations.

Theoretical and practical examinations are held in Alberta in February and in the summer of each year. Futher details, including information about prizes and awards, are to be found in the official announcements of the Board, obtainable by writing to The Western Board of Music, The University of Alberta.

*The Clinical Sciences Building, now under construction, is the first stage of a large expansion program centered on The University of Alberta Hospital*

*Television can sometimes help capture the intimacy lost when a university's classes become large. Here it enables dentistry students to observe surgical procedures at a range closer than ever before possible.*

# Academic Staff

## 251 / INSTRUCTIONAL AND ADMINISTRATIVE STAFF

NOTE: The following list was revised in June, 1968. The first of the two dates given in each enry is that of first appointment; the second, that of attaining the present rank.

AARON, Theodore Herschel, BSc MD (Alberta), Lecturer in Medicine (1965, 1964).

ABBOTT, Harvey, Leslie, BA (Memorial), MSc PhD (Alberta), Assistant Professor in Mathematics (1967, 1967).

ABU-LABAN, Baha R., BA MA (American University, Beirut), PhD (Washington), Associate Professor of Sociology (1961, 1967).

ADAMS, Peter Frederick Gordon, BEng MEng (N.S. Tech. College), PhD (Lehigh), Associate Professor of Civil Engineering (1960, 1966).

ADAMS, William Sanderson, BSc MSc (Alberta), Associate Professor of Computing Science (1962, 1966).

ADLER, John G., MSc (British Columbia), PhD (Alberta), Associate Professor of Physics (1968, 1968).

AFFLECK, Alan Ferguson, BPHE (Toronto), BEd (Alberta), MS (Indiana), Associate Professor of Physical Education (1951, 1962).

AFFLECK, Muriel Adeline, MEd (Alberta), EdD (Colorado State), Associate Professor of Elementary Education (1949, 1957).

AHMED, Asad, MSc (Aligarh), PhD (Yale), Assistant Professor of Genetics (1967, 1967).

AKSEL, Rustem, Dip. Ing. Agronome, Doctor of Agriculture (Ankara), Research Associate in Genetics (1966, 1966).

ALDERMAN, Richard B., MPE (British Columbia), EdD (California), Associate Professor of Physical Education (1965, 1967).

ALLARD, Charles Alexander, MD (Alberta), FR CS(C), FACS, Assistant Clinical Professor of Surgery (1951, 1964).

ALLBON, Leonard George, Teaching Diploma AOT (London), Assistant Professor of Occupational Therapy (1960, 1961).

ALLEN, June E., RN (St. Thomas Hospital, London), Lecturer in Nursing (1968, 1968).

ALLEN, Peter B. R., MSc MD (Alberta), FRCS (C), Lecturer in Surgery (1964, 1966).

ALLEN, Willard Finlay, BSc (W. Ontario), MA PhD (Toronto), Associate Professor of Chemistry (1948, 1954).

ALLIN, Eardley Samuel, BSc (Alberta), MD (Toronto), FRCS (London), FRCS(C), Instructor in Surgery (1941, 1947).

ALLIN, George Edgar, BSc MD (Alberta), FRCS (England), Sessional Instructor in Surgery (1960, 1960).

ALMON, Bert L., BA (Texas), MA (New Mexico), Assistant Professor of English (1968, 1968).

AL-SALAM, Mrs. Nadhla Abdul-Halim, BA (Baghdad), PhD (Duke), Assistant Professor of Mathematics (1966, 1966).

AL-SALAM, Waleed A., BS MA (California), PhD (Duke), Professor of Mathematics (1966, 1967).

ALTON, John Douglas McGregor, MSc MD (Alberta), Assistant Clinical Professor and Head of Plastic Surgery (1959, 1965).

ANDERSON, Arthur James, BSc (Alberta), MS PhD (Washington), Professor of Pharmacy (1949, 1965).

ANDERSON, Charles Campbell, MA EdB (Glasgow), PhD (Cantab), Professor of Educational Psychology (1957, 1963).

ANDERSON, David Trevor, BA (Manitoba), BA BCL (Oxon), Associate Professor of Law (1962, 1967).

ANDERSON, Kenneth Owen, BSc MSc (Alberta), Associate Professor of Civil Engineering (1957, 1962).

ANDERSON, Roland Frank, BA (British Columbia), MA (Wisconsin), PhD (Toronto), Assistant Professor of English (1968, 1968).

ANDERSON, Miss Ruby Olga, MEd (Alberta), Associate Professor of Physical Education (1956, 1961).

ANDERSON, Walter Stirling, BSc (Alberta), MS MD (Toronto), FRCS(C) FACS, Professor of Surgery (1941, 1956).

ANDREW, William Treleaven, BSc (Alberta), MS (Utah State), PhD (Michigan), Associate Professor of Horticulture (1959, 1959).

ANSELMO, John Edward, MD (Alberta), Lecturer in Surgery (1965, 1967).

AOKI, Tetsuo, BCom (British Columbia), MEd (Alberta), Associate Professor of Secondary Education (1964, 1967).

APEDAILE, Leonard Peter Petry, BSc (McGill), Assistant Professor of Agricultural Economics (1966, 1966).

ARCHER, Miss Violet, BMus (McGill), BMus MMus (Yale), Associate Professor of Music (1962, 1962).

ARMSTRONG, Heman Brock, MD (Alberta), Assistant Clinical Professor of Paediatrics (1950, 1959).

ARMSTRONG, Robert David, BEd BA MEd (Alberta), EdD (California), Associate Professor of Elementary Education (1962, 1964).

ARVIDSON, Robert Manfred, MA (Humboldt State College), PhD (Nevada), Assistant Professor of Psychology and Educational Administration (1967, 1967).

ATKINSON, Thomas Page, BSc BEd (Alberta), Associate Professor in Elementary Education (1963, 1967)

AUSTIN, Miss Patricia Louise, BPHE (Toronto), MA (Columbia), PhD (Michigan State), Professor of Physical Edumation (1947, 1966).

AUXIER, Miss Margaret Virginia, BA (Alberta), BA in Lib (Washington), Reference Librarian (1961, 1961).

AYER, William Alfred, BSc PhD (New Brunswick), FCIC, Professor of Chemistry (1958, 1967).

BAADSGAARD, Halfdan, BSc (Minnesota), PhD (Federal Inst., Zurich), Professor of Geology (1957, 1966).

BACON, Hugh MacRae, BSc (Mount Allison), MD (Dalhousie), Lecturer in Psychiatry (1966, 1967).

BAILEY, Arthur Wesley, BSA (British Columbia), MS PhD (Oregon State), Assistant Professor of Plant Science (1966, 1966).

BAIN, Gordon Orville, BSc MD (Alberta), Professor of Pathology (1952, 1967).

BAIRD, Richard Edward, BA (Augustana) MA PhD (Illinois), Associate Professor of Political Science (1960, 1965).

BAKKER, Jaap Jelle, BSc (Glasgow), MSCE (Purdue), Associate Professor of Civil Engineering (1959, 1962).

BALDWIN, Robert George, BA (British Columbia), MA PhD (Toronto), Professor and Chairman of English Department (1951, 1967).

BALL, George Eugene, AB PhD (Cornell) MS (Alabama), Professor of Entomology, (1954, 1965).

BALL, Miss Sandra Jean, MA (Washington), Assistant Professor of Sociology (1967, 1967).

BALLAH, Allan John, MA (Alberta), Assistant Professor of Romance Languages, (1964, 1966).

BANCROFT, Donald Asa, BSc MA (Alberta), Associate Professor in Department of Extension (1958, 1963).

BARAGAR, Francis Alvin, MSc (Manitoba), PhD (Brandeis), Assistant Professor of Mathematics (1962, 1962).

BARCLAY, Harold, BA (Boston), MA PhD (Cornell), Associate Professor and Acting Chairman of Department of Anthropology (1966, 1967).

BAREAU, Michael Louis, LèsL Dipl d'Et Sup (Sorbonne), Assistant Professor of Romance Languages (1966, 1966).

BARHAM, Richard Mackenzie, MA (Otago, Dunedin), Assistant Professor of Educational Psychology (1968, 1968).

BARKER, Burke McGray, LLB (Saskatchewan), Assistant Professor of Law (1967, 1967).

BARKER, Harold M., BSc (Manitoba), MD (W. Ontario), Lecturer in Psychiatry (1959, 1966).

BARR, Brenton Marshall, MA (British Columbia), Assistant Professor of Geography (1968, 1968).

BARR, James Stevenson, MB ChB (Glasgow), FRCOG FRCS(C), Lecturer in Obstetrics and Gynaecology (1958, 1966).

BARRINGTON, James, BA (Rangoon), Foreign Service Diploma (Oxon.), University Professor of Political Science (1966, 1968).

BARRY, Douglas Dennis, AOCA (Ontario College of Art), Extension Assistant Professor of Art (1960, 1963).

BARTELL, Marvin, BA (McGill), MBA (Chicago), Assistant Professor of Business Administration and Commerce (1965, 1965).

BARTELL, Mrs. Rivkah, MA (Hebrew University, Jerusalem), Assistant Professor of Educational Psychology (1965, 1966).

BARTON, Peter G., BSc PhD (Liverpool), Assistant Professor of Biochemistry (1966, 1966).

BAUER, Milton Frank, BA (Western Ontario), MA (Toronto), PhD (Chicago), Associate Professor and Acting Chairman of Department of Economics (1956, 1967).

BAY, Christian, LLB, PhD (Oslo), Professor and Head of Political Science (1966, 1966).

BEARD, Richard Lee, BA (Texas), PhD (Illinois), Associate Professor of Business Operations (1968, 1968).

BEATTY, David Delmar, BA (West. Washington State), MS (Wyoming), PhD (Oregon), Assistant Professor of Zoology (1964, 1964).

BEAUCHAMP, Louis Emile, MSc MD (Alberta), Assistant Clinical Professor in Paediatrics (1951, 1967).

BECK, Peter Roland, MD CM (Queen's), FRCS(C) FRCOG FACOG, Professor and Head of Obstetrics and Gynaecology (1965, 1965).

BEDNARSKI, Mrs. Hanna Jadwiga, MPhil (Warsaw), BLS (McGill), Librarian (1962, 1962).

BEILENSON, Miss Susanne Caroline, BSc PhD (London), Lecturer in Physiology (1965, 1967).

BEL, Francois, Doctorate ès Sciences (Lausanne), Assistant Professor of Bacteriology (1967, 1967).

BELL, David MacPherson, BA MD (Alberta), Instructor in Medicine (1953, 1953).

BELL, Donald Munns, MD (Alberta), FRCS(C) FACS, Lecturer in Obstetrics and Gynaecology (1951, 1955).

BELL, Gordon Irving, BA MD (Alberta), FACP, Lecturer in Medicine (1945, 1950)).

BELL, Harold Edwin, BSc MD (Alberta), Associate Professor of Pathology, Director, Division of Medical Laboratory Science (1957, 1966).

BELL, Irene Mary, BSc (Alberta), Lecturer in Nursing (1967, 1967).

BELL, James Baird, BA BEd (Saskatchewan) MEd (Alberta), Associate Professor of Secondary Education (1966, 1966).

BELL, Robert Edward, MD (Alberta), Associate Professor of Pathology and Honorary Lecturer in Medicine (1950, 1962).

BELLOW, Donald Grant, BASc (British Columbia), MSc PhD (Alberta), Associate Professor of Mechanical Engineering (1963, 1966).

BENNETT, Michael J., BSc (London), PhD (Sheffield), Assistant Professor of Chemistry (1968, 1968).

BENNETTS, David Rodney, Dip. Ed. (Bristol), Associate Professor of Art (1967, 1967).

BENT, Dale Harold, MSc (Alberta), Associate Professor in Business Administration and Commerce (1964, 1966).

BENTLEY, Charles Fred, MSc (Alberta), PhD (Minnesota), Professor of Soil Science and Dean of Agriculture (1946, 1959).

BENTLEY, Mrs. Helen Signe, MSc (Iowa State), Associate Professor of Household Economics (1947, 1966).

BEQIRAJ, Mahmet A., MS PhD (Cornell), Associate Professor of Sociology (1967, 1967).

BERCOV, Ronald David, BSc (Alberta), PhD (California I.T.), Associate Professor of Mathematics (1963, 1967).

BERG, Eric Richard, MA (Texas), MS PhD (Illinois), Associate Professor of Agricultural Economics (1962, 1962).

BERG, Roy Torgny, BSc (Alberta) MS PhD (Minnesota), Professor of Animal Science (1950, 1963).

BEFGEN, John Jacob, BSc BEd MEd (Manitoba), PhD (Alberta), Associate Professor of Educational Administration (1965, 1967).

BERGER, Allen, BA, EdD (Syracuse) MA (State University of New York), Associate Professor of Elementary Education (1968, 1968).

BERGMANN, John Francis, AB PhD (California), MA (Texas), Associate Professor of Geography (1960, 1963).

BERRY, Gerald Lloyd, BEd MA (Alberta), EdD (Colorado), Professor and Head of Secondary Education (1961, 1966).

BERTIE, John E., BSc, PhD (London), Associate Professor of Chemistry (1967, 1967).

BESNEY, Morris, BSc MD (Alberta), Instructor in Surgery (1958, 1959).

BESSAI, Mrs. Diane, Elizabeth, BA (W. Ontario), MA (London), Assistant Professor of English (1961, 1966).

BESSAI, Frank, MA (Saskatchewan), PhD (Toronto), Associate Professor of English (1960, 1966).

BESWETHERICK, Margaret Ann, BSc, MS (McGill), Assistant Professor in Nursing (1968, 1968).

BETTS, Donald Drysdale, MSc (Dalhousie), PhD (McGill), Professor of Physics (1956, 1966).

BHATIA, Avadh Behari, MSc DPhil (Allahabad), PhD (Liverpool), FRSC, Professor of Physics and Director of the Theoretical Physics Institute (1955, 1965).

BHATTACHARYYA, Nirmal Chandra, MA LLB (Calcutta), MA (Chicago), PhD (Australian National University), Associate Professor of Educational Foundations, (1965, 1965).

BICKNELL, John Evans, BSc BEd (Alberta) MSc PhD (Iowa State), Associate Professor of Educational Psychology (1966, 1966).

BIGG, Walter Lionel, BSc (Alberta), Associate Professor of Civil Engineering, (1957, 1960).

BIGGANE, Miss Arlene, BA, BLS (British Columbia), Librarian (1968, 1968).

BILSLAND, John Winstanley, MA (British Columbia) PhD (Toronto), Associate Professor of English (1955, 1963).

BIRSS, Fraser William, MA (Saskatchewan) DPhil (Oxon.), Associate Professor of Chemistry (1959, 1963).

BISHOP, Jay Kay, MA (Sacramento State College), Associate Professor of Educational Psychology and Elementary Education (1966, 1966).

BISSELL, Erwyn Wallace, BSc MD (Alberta), Instructor in Surgery (1961, 1961).

BLACK, William Robert, BSc MD (Alberta), Instructor in Medicine (1962, 1962).

BLACKLEY, Frank Donald, MA PhD (Toronto), Professor of History and Associate Dean of Arts (1950, 1968).

BLACKMORE, Robert Valentine, DDS (Alberta), PhD (Rochester), Professor of Operative Dentistry (1948, 1962).

BLANCHARD, William August, BA (San Francisco State College) MA PhD (Oregon) Assistant Professor of Psychology (1961, 1961).

BLENCH, Thomas, BSc (Glasgow), DSc (Alberta), Professor of Civil Engineering (1948, 1954).

BLISS, Lawrence C., MSc (Kent State), PhD (Duke), Professor of Botany (1968, 1968).

BLODGETT, Edward Dickinson, BA (Amherst College), MA (Minnesota), Assistant Professor of English and Romance Languages (1966, 1966).
BOAG, David Archibald, MSc (Alberta), PhD (Washington State), Assistant Professor of Zoology (1958, 1958).
BOCIURKIW, Bohdan Rostyslaw, MA (Manitoba), PhD (Chicago), Professor of Political Science (1956, 1967).
BODAK, Miss Trudy Blanch, BA (Queen's), BLS (Toronto), Librarian (1968, 1968).
BOERSMA, Frederic J., BS MA (Western Michigan), PhD (Michigan State), Associate Professor of Educational Psychology (1965, 1967).
BOILEAU, George René, BSc MD (Alberta), FRCS(C), Lecturer in Surgery (1952, 1964).
BOND, John Jameson, MA (Toronto), Director, Boreal Institute of Northern Affairs and Honorary Associate Professor of Anthropology (1967, 1967).
BONDAR, George Frederic, MSc (Manitoba), MD CM (McGill), FRCS(C), Lecturer and Research Associate in Surgery (1964, 1964).
BONE, Derek Anthony Peter, BA (Alberta), Director of Housing and Food Services (1966, 1968).
BONVALET, Mrs. Nicole E., Licence ès lettres, Diplome d'etudes superieures (Dijon) Agregation d'Anglais (Sorbonne), Lecturer in Romance Languages (1967, 1968).
BONVALET, Roland C., B.A. (British Columbia), MA (California), Assistant Professor of Romance Languages (1967, 1967).
BOODRAM, Mrs. Cynthia Aspasia Lynn, BSc (Saskatchewan), Instructor in Medical Laboratory Science (1966, 1966).
BORKENT, Albert, Dip (Utrecht), DDS (Alberta), Sessional Lecturer in Dentistry (1960, 1960).
BOSLEY, Richard N., AB (Utah), MA (Berkeley), Assistant Professor of Philosophy (1964, 1965).
BOUTHILLIER, Patrick Henry, BSc (Alberta), SM (Harvard), Professor of Civil Engineering (1947, 1965).
BOUWMAN, Henry W., BSc MD (Alberta), Sessional Instructor in Surgery (1964, 1964).
BOWEN, Peter, MD (Toronto), FRCP(C), Associate Professor of Human Genetics, Department of Paediatrics (1964, 1964).
BOWERS, Kenneth L., BA (Central Washington College), MA PhD (New York), Assistant Professor of Secondary Education (1966, 1966).
BOWKER, Wilbur Fee, BA LLB (Alberta), LLM (Minnesota), Professor of Law, Director of the Institute of Law Research and Reform (1945, 1968).
BOWLAND, John Patterson, BSA (Manitoba), MS (Washington State), PhD (Wisconsin), Professor of Animal Nutrition (1949, 1963).
BOYD, John Angus, BA (Saskatchewan), MD Manitoba), FRCS(C), FACOG, Lecturer in Obstetrics and Gynaecology (1954, 1958).
BOYD, Mark E., BA MD (Saskatchewan), FRCS FACOG, Instructor in Obstetrics & Gynaecology (1966, 1966).
BOYD, Thomas Alexander Somerville, MB ChB (Glasgow), FRCS (England), Associate Professor of Ophthalmology and Director, Division of Ophthalmology, Department of Surgery (1958, 1964).
BRADFORD, Samuel A., MSc (Missouri), PhD (Iowa State), Associate Professor of Mining and Metallurgy (1967, 1967).
BRAMLEY-MOORE, William, MD (Alberta), Lecturer in Medicine (1949, 1949).
BRANT, Charles Sanford, BA (Reed College), MA (Yale), PhD (Cornell), Professor of Anthropology and Chairman, Department of Anthropology (1961, 1968).
BRAUN, Richard Emil, AM (Michigan), Assistant Professor of Classics (1962, 1964).
BRETTEN, G. Rex, MA, LLB (Cantab.), Assistant Professor of Law, and Institute of Law Research and Reform (1968, 1968).
BRIDGER, William A., MSc PhD (Manitoba), Assistant Professor of Biochemistry (1967, 1967).
BRODIE, Harold Johnston, MSc (Manitoba), PhD (Michigan), Professor of Botany (1957, 1957).
BROOKS, Delmar Perry, BCom (Saskatchewan), CA, Administrative Accountant (1961, 1963).
BROOME, Thomas Paul, MD CM (Queen's), RCPS(C) FRCP(C), Instructor in Medicine (1964, 1964).
BROSCO, Andy Joe, BSc (Mount Union, Ohio), AM (Oberlin), PhD (Columbia), Associate Professor of Geology (1964, 1967).
BROWN, Gordon David, BSc MD (Alberta), Clinical Lecturer in Medicine (1954, 1957).
BROWN, Leigh Borrodell, BSc MD (Alberta), FRCS(C), Assistant Clinical Professor in Obstetrics and Gynaecology (1957, 1967).
BROWN, Robert Karl, MSc (Alberta), PhD (McGill), Professor of Chemistry and Associate Dean of Graduate Studies (1946, 1967).
BRUCE, William John, MEd (Alberta), PhD (Washington), Associate Professor of Mathematics (1958, 1959).
BRYAN, Alan Lyle, MA (Washington), PhD (Harvard), Associate Professor of Anthropology (1963, 1967).
BRYAN, Rorke Bardon, BA (Trinity College, Dublin), PhD (Sheffield), Assistant Professor of Geography (1967, 1967).
BRYAN, Mrs. Ruth (Gruhn) BA PhD (Radcliffe), Assistant Professor of Anthropology (1965, 1965).
BUCHANAN, David Mallory, MD (Alberta), MRCOG, FACOG, Instructor in Obstetrics and Gynaecology (1964, 1964).
BUCHANAN, David Meldrum, BSc (Manitoba), DDS (Alberta), Sessional Lecturer in Dentistry (1961, 1961).
BUCHANAN, Donald Ian, MB ChB (Glasgow) Lecturer in Pathology (1955, 1962).
BUCK, Robert John, BA (Alberta), MA (Kentucky), PhD (Cincinnati), Professor and Head of Classics (1960, 1967).
BUCK, Walter A., DDS (Alberta), Sessional Lecutrer in Dentistry (1963, 1963).
BUECKERT, Frank, BEd (Saskatchewan), MA (Columbia), Associate Professor of Drama (1955, 1964).
BUGIS, Joseph, BA MD (Alberta), RCPS(C), Lecturer in Obstetrics & Gynaecology (1954, 1964).
BUMBERGER, Chester S., BS (Oregon College of Education), MD BEd (Oregon), Associate Professor of Educational Administration (1967, 1967).
BURCHAK, Carl Edward, MD (Alberta), Instructor in Paediatrics (1965, 1966).
BURDEN, Gary Allen, MA (Montana), Sessional Lecturer in History (1967, 1967).
BURFOOT, Donald, BSc (Alberta), Special Lecturer in Industrial and Vocational Education (1967, 1967).
BURNHAM, Miss Kay Ardell, DDS (Alberta), Sessional Lecturer in Dentistry (1963, 1963).
BURNS, William Alexander Douglas, BA (Alberta) Assistant Registrar (1960, 1964).
BURSEWICZ, Mrs. Anne Marjory, MB ChB (Edinburgh, DPH (Toronto) Assistant Professor of Bacteriology (1960, 1960).
BURWASH, Ronald Allan McLean, BSc BEd MSc (Alberta) PhD (Minnesota) Professor of Geology (1956, 1965).
BUSE, Adolf, BA (Alberta), Assistant Professor of Economics (1966, 1966).
BUTLER, Derril Clive, MA (Alberta) Assistant Professor of English (1966, 1966).
BUXTON, Earl William, BA BEd (Alberta), MA (Washington), PhD (Stanford), Professor of Secondary Education (1948, 1959).
CAIRNS, Alexander Duncan, BA (Alberta), Registrar (1946, 1956).
CAIRNS, Andrew, MD (Alberta), Lecturer in Medicine (1952, 1964).
CAIRNS, Miss Eleanor Grace, BSc (Alberta), Lecturer in Household Economics (1944, 1967).
CALDER, James, MD (Alberta), Clinical Professor of Paediatrics (1933, 1954).
CALDWELL, Ian Carl, BSP MA PhD (British Columbia), Assistant Professor of Biochemistry (1966, 1966).
CALLAGHAN, John Carter, BSc MD (Toronto), FRCS(C) FACS, Clinical Professor of Surgery (1955, 1960).
CALVERT, John Mortimer, DDS (Alberta), Sessional Lecturer in Dentistry (1962, 1962).
CAMERON, David Glen, AB (Princeton) PhD (Stanford), Assistant Professor of Genetics (1964, 1964).

CAMERON, Donald Forbes, MBE, BA MD (Alberta), Associate Professor of Anaesthesia and Associate Dean, Faculty of Medicine (1950, 1965).

CAMERON, Donald Roy, BA MEd (Alberta), EdD (Syracuse), Associate Professor of Educational Psychology and Director, Center for the Study of Mental Retardation (1962, 1967).

CAMERON, Gordon Walter, BA (Saskatchewan) MD CM (McGill) FRCS, Lecturer in Surgery (1955, 1958).

CAMERON, Robert Brúce, DDS LDS (Toronto), Sessional Lecturer in Dental Therapeutics (1946, 1946).

CAMPBELL, Mrs. Constance Hope, BSc (McGill), Instructor in Physiology (1959, 1965).

CAMPBELL, Donald James, BSc (Alberta) MSc PhD (Purdue), Assistant Professor of Clinical Pathology (1960, 1966).

CAMPBELL, Duncan Darroch, BCom., BA (British Columbia) MA (Alberta), Professor and Director of Extension (1949, 1956).

CAMPBELL, Ian Alexander, BSc (London) MA PhD (Colorado), Assistant Professor of Geography (1966, 1966).

CAMPBELL, James Nicoll, BA (W. Ontario and British Columbia) MSc (British Columbia), PhD (Chicago) Associate Professor of Microbiology (1960, 1964).

CANFIELD, Charles R., BS (American University), Manager, University Bookstore (1967, 1967).

CANTINE, LaVerne David, MA (Iowa), Assistant Professor of Art (1965, 1967).

CANTOR, Maxwell Mordecai, BSc MD (Manitoba) FACP, Assistant Clinical Professor of Pathology (1930, 1956).

CARD, Brigham Young, BSc BEd (Alberta), PhD (Stanford), Professor of Educational Foundations (1945, 1967).

CARLTON, Terence Roy, BA (Saskatchewan), MA (Alberta), Assistant Professor Slavonic Languages (1965, 1967).

CARMICHAEL, Mrs. G. Joan K., AOCA (Ontario College of Art), Assistant Professor of Drama (1966, 1967).

CARMICHAEL, John William, MSc (Alberta), MA PhD (Harvard), Professor of Bacteriology (1954, 1966).

CARPENTER, Mrs. Sandra W., BA (California), Assistant Professor of Secondary Education (1968, 1968).

CARSON, Miss Audrey Marie, BEd (Alberta), MA (Colorado State), Associate Professor of Physical Education (1958, 1966).

CARSON, George Donaldson, MD (Alberta), Instructor in Psychiatry (1954, 1954).

CASY, Alan Frederick, BSc PhD (London), Associate Professor of Pharmacy (1966, 1966).

CATMUR, David MacLennan, BS (Rhode Island), MA (Fletcher School of Law and Diplomacy), Associate Professor, Department of Extension (1968, 1968).

CAVELL, Ronald George, BSc (McGill), MSc PhD (British Columbia), PhD (Cantab.), Associate Professor of Chemistry (1964, 1968).

CHA, Miss Karen Lynda, BA BLS (British Columbia), Librarian (1966, 1966).

CHAMBERS, Mrs. Juanita, BA (McGill), MA PhD (Montreal), Associate Professor of Educational Psychology (1967, 1967).

CHARLESWORTH, Henry Alexander Kaye, MA (Cantab.), PhD (Glasgow), Professor of Geology (1956, 1968).

CHARMONMAN, Srisakdi, BEng (Chulalongkorn), MSc (SEATO, Thailand), PhD (Georgia I.T.), Associate Professor of Computing Science (1966, 1967).

CHARNOCK, John Stewart, BSc PhD (Adelaide), Associate Professor of Pharmacology (1968, 1968).

CHATTEN, Leslie George, MSc (Alberta), PhD (Ohio State), Professor of Pharmacy (1961, 1965).

CHEN, I-Ngo, BSc (National Taiwan), MSc (Chiao Tung), PhD (Ottawa), Assistant Professor of Computing Science (1968, 1968).

CHEN, Tung-pi, LLB (National Taiwan), MCL (Columbia), LLM (Yale), Assistant Professor of Law (1967, 1967).

CHENEY, Miss Roberta, BS (Oregon State), MS (Purdue), Assistant Professor in Household Economics (1966, 1968).

CHENG, James Kuo-Chiang, BA (George Fox College), MLS (George Peabody College), Librarian (1967, 1967).

CHENG, Kwo Chang, BS (Cheng-Kung), MS (Kansas State), PhD (Ohio State), Associate Professor of Mechanical Engineering (1962, 1966).

CHEPEHA, Nicholas, BEd, MD (Alberta), Honorary Instructor in Preventive Medicine (1963, 1964).

CHERRY, Richard R., BSc MD CM (McGill), Assistant Professor, Family Care Unit, Community Medicine (1967, 1967).

CHITTICK, Miss Mavis Kathleen, BSc (Alberta), MA (Yale), Assistant Professor of Nursing (1967, 1967).

CHRISTENSEN, Gustav Storm, BSc (Alberta), MASc PhD (British Columbia), Assistant Professor of Electrical Engineering (1966, 1966).

CIRILLO, Renato Publius, BA DD (Malta), BSc (Louvain), MSc (London), Associate Professor of Economics (1966, 1966).

CLANDFIELD, Frederick David, BEd MA (Alberta), Assistant Professor of English (1963, 1963).

CLANDININ, Donald Robert, MSA (British Columbia), PhD (Wisconsin), Professor of Poultry Nutrition (1938, 1953).

CLARE, Rupert McConnell, MD (Alberta), Assistant Professor in Radiology (1946, 1966).

CLARK, Andrew Kinlock, MEd (Manitoba), BA BEd (Alberta), Assistant Professor of Industrial and Vocational Education (1967, 1968).

CLARK, Marvin Altyn, BS (St. Cloud State College), MA (Minnesota), Associate Professor of Secondary Education (1966, 1966).

CLARKE, Kenneth Andrew Connal, BSc MD (Alberta), Clinical Professor of Surgery (1950, 1962).

CLARKE, Kenneth Scott, MD CM (Queen's), FRCS (Edinburgh), FRCS (England), Instructor in Surgery (1964, 1965).

CLARKE, Thomas Roy, MD (Alberta), FRCOG, Associate Clinical Professor of Obstetrics and Gynaecology (1941, 1963).

CLEGG, Lawrence Frank Levey, BSc (Toronto), PhD DSc DIC (London), FIBiol, Professor and Head of Food Science (1958, 1958).

CLIFFORD, Hugh Fleming, MS (Michigan State), PhD (Indiana), Assistant Professor of Zoology (1965, 1965).

CLINCH, Norman Frederick, BSc PhD (London), Assistant Professor in Physiology, (1965, 1967).

CODER, David, AB (Illinois), Assistant Professor of Philosophy (1967, 1967).

COFFMAN, Miss Patricia Joyce, LLB (Cumberland Law School), BA MALS (Peabody), LLM (New York), Law Librarian and Associate Professor of Law (1965, 1965).

COGLON, Russel Barton, BSc MD (Alberta), Instructor in Medicine (1962, 1963).

COLBOURNE, John Robert, BA (Cantab.), MS PhD (Stanford), Associate Professor of Mechanical Engineering (1967, 1968).

COLLIER, Herbert Bruce, MA PhD (Toronto), FRCS, Professor of Pathology (1949, 1964).

COLLINSON, Donald Maurice, DDS (Alberta), Associate Professor of Dentistry (1959, 1967).

COLOTELO, Nicholas, BSc (Ontario Agricultural College), MSc PhD (Saskatchewan), Associate Professor of Plant Science (1962, 1967).

COLTER, Miss Carla Kathleen Alix, BA (McGill), Associate Professor of French (1959, 1967).

COLTER, Donald Reid, BSc, MD, LMCC (Alberta), Instructor in Orthopaedic Surgery (1966, 1966).

COLTER, John Sparby, BSc (Alberta), PhD (McGill), Professor and Head of Biochemistry (1961, 1961).

COLWELL, Miss Jane, MA (California), Museum Preparator (1966, 1966).

COMBS, Weslie, BS (California State Polytechnic), MS (Minnesota), PhD (Wyoming), Assistant Professor of Animal Science (1962, 1962).

CONGER, Miss Patricia Ruth, BS (Florida State), MA (Michigan State), Assistant Professor of Physical Education (1963, 1965).

CONNELL, Allison Beresford, BA (Mt. Allison), D de l'U (Paris), Associate Professor of French (1965, 1965).

CONRADI, Gerhard Johann, MD (Jena), Instructor in Paediatrics (1954, 1954).
CONROY, Frederick David, MD (Alberta), Instructor in Surgery (1946, 1946).
COOK, Fred Delmar, MSA (British Columbia), PhD (Edinburgh), Associate Professor of Soil Microbiology (1964, 1964).
COOKE, Murray Stewart, BSA (Saskatchewan), Personnel Officer (1957, 1957).
COOKSON, Francis B., BSc MB ChB (Manchester), Associate Professor of Anatomy (1966, 1966).
CORMACK, Robert George Hall, MA PhD (Toronto), FRSC, Professor of Botany, (1936, 1957).
CORMAN, Bernard R., MA (Akron), PhD (Columbia), Professor and Head of Educational Psychology (1966, 1966).
CORNS, William George, MSc (Alberta), PhD (Toronto), Professor and Head of Plant Science (1946, 1961).
COSSINS, Edwin Albert, BSc PhD (London), Associate Professor of Botany (1962, 1965).
COSTIGAN, Roy Louis, DDS (Toronto), Sessional Lecturer in Dentistry (1961, 1961).
COSTOPOULOS, Lambros Basil, MD (Alberta), Lecturer in Radiology (1966, 1968).
COTE, Andre David Joseph, BA MEd (Alberta), Assistant Professor in Educational Psychology (1965, 1968).
COTTLE, Walter Henry, MA (British Columbia), PhD (Washington), Associate Professor of Physiology (1956, 1961).
COUTTS, Herbert Thomas, BA (Toronto), MA (Alberta), PhD (Minnesota), Professor and Dean of Education (1946, 1955).
COUTTS, Ronald Thomson, BSc ARCST PhD (Glasgow), Associate Professor of Pharmacy (1966, 1966).
COUVES, Cecil Melville, BA (Saskatchewan), MD (Manitoba), FACS FRCS (Edinburgh) FRCS (C), Associate Professor of Surgery (1957, 1960).
COX, Bruce Alden, BA (Reed), MA (Oregon), Assistant Professor of Anthropology (1967, 1967).
CRAIG, Douglas Abercrombie, BSc, PhD (Canterbury), Assistant Professor of Entomology (1966, 1968).
CRAWFORD, Robert James, MSc (Alberta), PhD (Illinois), Professor of Chemistry (1956, 1967).
CREE, George Charles, MA (McGill) PhD (Washington, Mo.), Associate Professor of Mathematics (1957, 1959).
CREORE, Mrs. Jo-Ann Davis, AB (Lake Erie College), MA (Washington), Assistant Professor of Romance Languages (1966, 1966).
CRIGHTON, Arthur Bligh, LRSM LRCT MusBac (Toronto), DMA (So. California), Associate Professor of Music (1949, 1957).
CROCKFORD, Peter Michael, MD (Alberta), FR CP(C), Assistant Professor of Medicine (1966, 1966).
CROOKS, Hugh James, BSc MD (Alberta) RCPS (C), FACOG, Assistant Professor of Obstetrics and Gynaecology.
CROSBY, Douglas Richard, BSc (Alberta), MA PhD (Princeton), DPhil (Oxon.), Associate Professor of Mathematics (1950, 1953).
CROWTHER, Joan D., BA (British Columbia), MA (Bryn Mawr), Assistant Professor of English (1967, 1967).
CUMMING, George Leslie, MA (Saskatchewan) PhD (Toronto), Associate Professor of Physics (1959, 1962).
CUNNINGHAM, Kenneth Robert, BA (Oregon), Assistant Professor of Sociology (1965, 1965).
CUTLER, Mrs. Beverly Romney, BA (Utah) MS (Brigham Young) PhD (Stanford), Associate Professor of Elementary Education (1966, 1968).
DABROWSKI, Kasimietz, PhD MD (Poznan), MD (Geneva), Visiting Professor of Psychology (1965, 1965).
DAFOE, Colin Scott, MD CM (Queen's), FRCS (Edinburgh) Lecturer in Medicine, (1952, 1966).
DAKIN, Mrs. Joan Elizabeth, BSc (Alberta), Sessional Instructor in Biochemistry (1961, 1961).
DALLA LANA, Ivo Giovanni, BASc (British Columbia), MSc (Alberta), PhD (Minnesota), Professor of Chemical and Petroleum Engineering (1957, 1968).
D'ALQUEN, Richard John E., BA (Nottingham), MA (Alberta), PhD (Illinois), Assistant Professor of Germanic Languages and General Linguistics (1968, 1968).
DANIEL, Mrs. Betty N., AB (Mount Holyoke College), AM (John Hopkins), Sessional Lecturer in Zoology (1964, 1965).
DANIEL, Edwin Embrey, MA (Johns Hopkins), PhD (Utah), Professor and Head of Pharmacology (1961, 1961).
DARWICK, Miss Doris, BSEduc (Florida State), MA (Michigan State), Assistant Professor of Physical Education (1963, 1965).
DARWISH, David, BSc (Alberta), PhD (UCLA), Associate Professor of Chemistry (1958, 1963).
DAS, J. Prasad, BA (Utkal), MA (Patna), PhD (London), Associate Professor, Centre for the Study of Mental Retardation (1968, 1968).
DAVEY, Peter William, MD CM (Queen's), Assistant Professor of Pathology (1952, 1958).
DAVEY, Ronald Austin, BA (London), Professor and Head, Department of Art (1967, 1967).
DAVIDSON, Mrs. Katherine Maud, BSc (Alberta), Lecturer in Dentistry (1961, 1963).
DAVIS, Charles, STL (Pontifical Gregorian University), Professor of Religious Studies (1967, 1968).
DAVIS, Mrs Mary Adam, MSW (McGill), Sassional Instructor in Psychiatry (1955, 1955).
DAVIS, Ray George, BSc MD (Alberta), MRCPS, Instructor in Surgery (1958, 1958).
DAVIS, Stuart George, MSc (Alberta), PhD (McGill), Associate Professor of Chemistry (1942, 1951).
DAVY, Grant Robert, BA (W. Ontario), MA PhD (Fletcher School of Law and Diplomacy), Professor of Political Science (1951, 1966).
DAWSON, Wilfred Kenneth, BASc (Laval), MA PhD (Queen's), Professor and Assistant Chairman of Physics (1959, 1966).
DAY, Frederick George, BSc MD (Alberta), MChOrth (Liverpool), FRFPS (Glasgow), Lecturer in Orthopedic Surgery (1952, 1960).
DAY, Richard Allan, MD (Toronto), FRCS(C), Lecturer in Obstetrics & Gynaecology (1964, 1967).
DAYKIN, Philip N., MA PhD (British Columbia), Visiting Assistant Professor of Physics (1966, 1966).
DEANE, Gordon Alan, DDS (Alberta), Lecturer in Dentistry (1960, 1961).
DELEHANTY, John Jerome, BS (Minnesota), Associate Professor of Economics (1962, 1967).
DE LUNA, Mrs. Barbara Nielsen, BA (Washington), MA PhD (Iowa), Associate Professor of English (1963, 1968).
DE LUNA, Frederick Adolph, MA PhD (Iowa), Associate Professor of History (1963, 1968).
DE MAN, Johannes Maria, BChemEng (Arnhem), PhD (Alberta), Associate Professor of Food Science (1959, 1963).
DENHAM, Ross Allan, BCom (Alberta), MBA Toronto), CA, Assistant Professor in Business Administration and Commerce (1963, 1965).
DENNIS, Miss Thelma Bernice, BSc HEc (Alberta), MS (Pennsylvania State) Assistant Professor of Household Economics (1962, 1963).
DEVINE, Stewart William, BA MD (Saskatchewan), FRCS(C), FACOG, Instructor in Obstetrics and Gynaecology (1964, 1964).
DICK, Henry Marvin, DDS (Alberta), Associate Professor of Oral Pathology (1968, 1968).
DIERICH, Klaus Paul Erich, A.R.T. (University of Alberta Hospital), Instructor in Pathology (1965, 1965).
DIDUCH, Lawrence Theodore, MD (Alberta), Instructor in Surgery (1966, 1966).
DIMIC, Mrs. Colette Anne-Marie, MA (Paris), PhD (Freiburg), Assistant Professor of Germanic Languages and General Linguistics and Romance Languages (1966, 1967).
DIMIC, Milan Velimir, Dip (Belgrade), Associate Professor of German (1966, 1968).
DINWOODIE, David Hepburn, BA (Denver), MA PhD (Colorado), Assistant Professor of History (1966, 1966).
DITZIAN, Zeev, MSc PhD (Hebrew University, Jerusalem), Associate Professor of Mathematics (1967, 1967).

DIXON, Allan Alvin, BSc MD (Alberta), MS (Minnesota), Lecturer in Medicine (1958, 1958).

DIXON, John Michael Siddons, MB BCh MD (Wales), Professor and Head, Provincial Laboratory of Public Health (1967, 1967).

DOBBIE, Miss Barbara Jean, RN (Calgary General Hospital), BN (McGill), Lecturer, School of Nursing (1967, 1967).

DOBBS, Bryan Griffith, BA (Manitoba), MA (Wisconsin), Assistant Professor of Romance Languages (1968, 1968).

DODDS, Miss Mary Isobel, BCom (Alberta) MS (Columbia), Extension Librarian (1955, 1957).

DOLGOY, Max, MD (Alberta) Instructor in Community Medicine (1964, 1964).

DONALD, Edward Ferris, MD (Alberta), Lecturer in Medicine (1945, 1950).

DONNELLY, Ronald Edward, DDS (Alberta), Lecturer in Dentistry (1962, 1962).

DORFMAN, Eugene, AB (Montclair State), AM PhD (Columbia), Professor of Romance Languages (1965, 1968).

DORSEY, Francis Richard James, BSc MD (Alberta), Instructor in Obstetrics & Gynaecology (1954, 1956).

DOUGALL, Robert Henry, BAct (Saskatchewan), BSc MD (Alberta), Lecturer in Medicine (1958, 1964).

DOW, Miss Helen Jeannette, BA (Toronto), MA PhD (Bryn Mawr), Associate Professor of Art (1966, 1967).

DOWN, Miss Edith Emily, BA BSc (Seattle), MA (British Columbia), PhD (Cornell), Assistant Professor of Secondary Education and Household Economics (1966, 1967).

DOWNS, William James, BA (Alberta) MD CM (McGill), Instructor in Medicine (1948, 1948).

DRAKE, Clare James, BPE (British Columbia), BEd (Alberta), MSc (Washington), Associate Professor of Physical Education (1958, 1966).

DRALLE, Wayne Roger, BA (W. Washington State) MS EdD (Indiana), Associate Professor of Secondary Education and Director of Audio-Visual Media Centre (1965, 1967).

DRANCHUK, Peter Michael, MSc (Alberta), Associate Professor of Chemical and Petroleum Engineering (1953, 1960).

DRUGGE, Sten Erick, BA (British Columbia) PhD (Ohio State), Associate Professor of Economics (1964, 1968).

DU HEAUME, Brian H., MB BS MRCS LRCP (London), Instructor in Community Medicine (1966, 1966).

DUKE, Charles Gavin, DDS (Alberta) Sessional Lecturer in Prosthetic Dentistry (1948, 1948).

DUNCAN, Malcolm McFarlane, BA (British Columbia), BLS (McGill), Librarian (1966, 1966).

DUNCAN, Neil Fraser, BSc MD (Alberta), Associate Clinical Professor of Paediatrics (1954, 1966).

DUNFORD, Hugh Brian, MSc (Alberta) PhD (McGill), Professor of Chemistry (1957, 1968).

DUNLOP, Donald L., MD BSc (Manitoba), MS (Nebraska), FRCS(C), Associate Professor of Obstetrics and Gynaecology (1967, 1967).

DVORKIN, Joseph, BA MD (Alberta), Assistant Clinical Professor of Medicine (1950, 1959).

DYER, Frederick Norman, BSc (E. Michigan State), MA PhD (Michigan State), Assistant Professor of Educational Psychology (1966, 1966).

DYER, Mrs. Jean Louise, BS (Iowa State), MA (Michigan State), Assistant Professor of Educational Psychology (1966, 1966).

EAGLE, John Andrew, BA (United College, Winnipeg), MA (Toronto), Assistant Professor of History (1968, 1968).

EASTMAN, William, AB (Oberlin), AM PhD (Brown), Assistant Professor of Philosophy (1966, 1966).

EASTWOOD, Benjamin Joseph, DDS (Alberta), Assistant Professor of Orthodontic Dentistry (1946, 1960).

EBERLAIN, E. Larry, BS LLB (Wisconsin), BD (Garrett Theological Seminary), PhD (Michigan State), Assistant Professor of Educational Psychology (1967, 1967).

EDDY, George Everett, BSc MD CD (Dahousie), FRCP(C), Associate Professor in Paediatrics (1961, 1968).

EDWARDS, Allan Manning, BSc MD (Alberta), FRCP(C), Assistant Clinical Professor in Medicine (1956, 1966).

EDWARDS, Frank John, MD CM (McGill), Instructor in Psychiatry (1959, 1959).

EDWARDS, Glen Elmer, BSc MD (Alberta), FRCS(C), Instructor in Surgery (1963, 1964).

EGERT, Eugene, BSc MA (British Columbia), PhD (Texas), Assistant Professor of Germanic Languages (1967, 1967).

EID, Thomas Cyril, BA (Saskatchewan) MD (Toronto)), FRCS(C), Instructor in Surgery (1964, 1964).

EIDEM, Rodney Norman, BA (Saskatchewan) MD (Alberta), Instructor in Medicine (1962, 1962).

EIKELAND, Mrs. Audrey M., BA (Alberta), AMLS (Michigan), Librarian (1965, 1965).

EINBLAU, Mrs. Linda Roberta, BA (Alberta), BLS (British Columbia), Librarian (1967, 1967).

ELDER, Andrew Thomson, BA (Alberta), MA PhD (Toronto), Professor and Associate Head of English (1950, 1963).

ELLIOT, James Ingham, BSA (Guelph), MSc (Alberta), Lecturer in Animal Science (1968, 1968).

ELLIOTT, Miss Amy Mary, BSc (W. Ontario), MPH (Michigan), Assistant Professor of Extension (1967, 1967).

ELLIOTT, Geoffrey Michael, BSc (London), Assistant Professor of Physical Education (1963, 1963).

ELLIOTT, James Francis, BA MD (Alberta), FRCP(C), FACP, Director of Student Health Services and Clinical Professor of Medicine (1946, 1953).

ELLIS, Miss Margaret, Dip (Chelsea College), Teach. Cert. (London), Assistant Professor of Physical Education (1964, 1967).

ELTON, Charles Denzil Hurley, MRCS LRCP (London), DA (Canada), Instructor in Anaesthesia (1960, 1960).

EMERY, Charles David, BA (Dunelm), ALA Order Librarian (1967, 1967).

EMPEY, Miss Elizabeth Louise, BSc (Alberta), MNS PhD (Cornell), Professor and Director School of Household Economics (1947, 1960).

ENGEL, Bernard B., AB (Allegheny College), MFA (Yale), Associate Professor of Drama (1965, 1968).

ENGELMANN, Frederick Charles, AB AM (UCLA), MA PhD (Yale), Professor of Political Science (1962, 1966).

ENGLEFIELD, Colin George, BSc PhD (London), Assistant Professor of Electrical Engineering (1964, 1964).

ENGLISH, Miss Moira Latimer, BA (British Columbia), MLS (Washington), Assistant Librarian, Extension (1957, 1964).

ENNS, Frederick, MEd PhD (Alberta), Professor of Educational Administration (1961, 1966).

ERIKSSON, Arthur William Emanuel, BSc (Alberta), MSc (Washington), Associate Professor of Physical Education (1945, 1951).

EVANS, Brian Llewellyn, BA (Alberta), PhD (London), Associate Professor of History (1961, 1967).

EVANS, William George, MSc PhD (Cornell), Associate Professor of Entomology (1958, 1961).

EYFORD, Glen Allenby, BA (Manitoba), MA (Toronto), Associate Professor and Assistant Director of Extension (1960, 1963).

FAIR, Donald Clarence, BEd MA (Alberta), PhD (Minnesota), Associate Professor of Educational Psychology (1957, 1967).

FARMER, Miss Geraldine Mary, BEd (Alberta), MA PhD (Minnesota), Associate Professor of Secondary Education (1960, 1964).

FARNELL, Mrs. Margaret Isabel, BA (Alberta), BLS (Simons College), Undergraduate Librarian (1963, 1964).

FARYON, Richard Rhodes, BA (W. Ontario), MBA (Columbia), Assistant Professor, Department of Extension (1967, 1967).

FAUCHER, Manoel, LenDroit (Paris), MA (California), Professor of French (1948, 1968).

FAULDS, Alexander Gordon, MCSP (London), Assistant Professor and Head, Division of Physiotherapy (1958, 1967).

FAULKES, Miss Margaret, Diploma in Education (London), Assistant Professor of Drama and Secondary Education (1967, 1967).

FAWCETT, David MacIndoo, BSc MD (Alberta), MSc PhD (McMaster), Assistant Professor of Medicine (1964, 1964).

FEARON, Daniel Patrick, MA (Alberta), Lecturer in Romance Languages (1965, 1967).

FEE, Alan Douglas, DDS (Alberta), MSc (Ohio State), Professor and Head of Prosthetic Dentistry (1946, 1962).

FEHLING, Jürgen R., DipIng (Bergakadmie Clausthal), DrRerNat (T. H. Stuttgart), Associate Professor of Mining and Metallurgy (1965, 1965).

FELDMAN, Leonard A., BBA (City College, N.Y.), MFA (Carnegie), Assistant Professor of Drama (1965, 1965).

FENTON, Miss Yvonne, BA (Dunelm.), ALA First Assistant, Library (1953, 1964).

FERGUSON, William Foster, BSc MD (Alberta), Associate Clinical Professor of Obstetrics and Gynaecology (1959, 1966).

FERRATE, Juan, Lic (Barcelona), Associate Professor of Spanish (1961, 1964).

FETTERMAN, Miss Nelma Irene, BEd (Alberta), MA (Michigan State), Lecturer in Household Economics (1968, 1968).

FIELD, Miss Peggy Anne, SRN SCM (England), Dip T and S (McGill), Assistant Professor in Obstetrics (1964, 1968).

FIFIELD, Mrs. Benita Bradley, MAOT OT Reg. Lecturer in Occupational Therapy (1964, 1964).

FILIPCHUK, Cornel Edward, DDS (Alberta), Lecturer in Dentistry (1961, 1962).

FILIPKOWSKI, Miss Elizabeth Helen, BEd (Alberta) MA (Columbia), Associate Professor of Elementary Education (1957, 1966).

FISHER, Anthony Dwight, AM PhD (Stanford), Assistant Professor of Anthropology and Educational Foundations (1965, 1965).

FISHER, Donald Grant, BE MSc (Saskatchewan), PhD (Michigan), Associate Professor of Chemical and Petroleum Engineering (1964, 1966).

FISHER, Sethart, MA PhD (California), Associate Professor of Sociology (1967, 1967).

FITZGERALD, Donald, MA PhD (Illinois) Professor of Educational Psychology (1968, 1968).

FLEMING, Henry Sanford Alexander, DDS (Alberta), Assistant Professor of Dentistry (1963, 1964).

FLEMING, Robert Andrew, MD MS (Dunelm.), FICS, FRCS (Edinburgh), Instructor in Medicine (1964, 1964).

FOLEY, David William, BA (McMaster) BLS (Toronto), AMLS (Michigan), Associate Professor, School of Library Science (1967, 1967).

FOLINSBEE, Robert Edward, BSc (Alberta), MA PhD (Minnesota), Professor and Head of Geology (1946, 1955).

FORBES, John Allison, MEd (Alberta), MA (Iowa), Associate Professor of Art (1949, 1958).

FORCADAS, Alberto M., BA (Georgia), MA PhD (Missouri), Assistant Professor of Romance Languages (1966, 1966).

FORD, George, MSc (Alberta), PhD (Stanford), Professor and Head of Mechanical Engineering (1942, 1959).

FORD, Harvey Wilson, BE BCom (Saskatchewan), Assistant Professor of Business Administration and Commerce, Executive Secretary Academic Development Committee (1962, 1968).

FORREST, James French, MA BLitt (Glasgow), AM PhD (Cornell), Associate Professor of English (1960, 1964).

FORSTER, John, BA (Kent State), MA (Hawaii), PhD (California), Professor of Sociology (1968, 1968).

FOSTVEDT, Thorleif, BSc (Alberta), MSc (Chicago), Associate Professor of Mathematics (1945, 1955).

FOURNIER, Lionel Joseph, BA BCom (British Columbia), BSc (McGill), MA (Alberta) Associate Professor of Physical Education (1963, 1967).

FOWLER, Eldon Lloyd, MSc (Alberta), Associate Professor of Civil Engineering (1960, 1960).

FOX, Miss Elizabeth Ann, BA (Alberta), BLS Toronto), Assistant Cataloguer (1967, 1967).

FOX, Richard Carr, AB (Hamilton College), MSc (Syracuse), PhD (Kansas), Assistant Professor of Geology and Zoology (1965, 1965).

FRAGA, Serafin, Lic DR (Madrid), Associate Professor of Chemistry (1963, 1965).

FRANCIS, Azra Daniel, BA, MA, LTCL (Natal), Assistant Professor of Drama (1967, 1967).

FRANCIS, Robert Robertson, BA MD (Alberta), FRCS(C) FACS, Assistant Clinical Professor of Surgery, (1951, 1960).

FRANCK, Jurgen Peter, DipPhys DrDerNat (Hamburg), Associate Professor of Physics (1963, 1965).

FRANK, George B., BS (City College, New York), MSc (Ohio State), PhD (McGill), Professor of Pharmacology (1965, 1965).

FRASER, Robert Stewart, BSc MD MSc (Alberta), FRCP(C) FACP Professor of Medicine 1953, 1964).

FREEDMAN, Herbert I, BSc, MA PhD (Manitoba), Assistant Professor of Mathematics (1967, 1967).

FREEMAN, Gordon Russel, MA (Saskatchewan), PhD (McGill), DPhil (Oxon.), Professor of Chemistry (1958, 1965).

FREEMAN, Peter Leonard, BA, LLB (Manitoba), Assistant Professor of Law (1968, 1968).

FREIFIELD, Miss Norma Elizabeth, BA (Alberta), BLS (Toronto), Circulation Librarian (1941, 1950).

FREW, William Douglas, MB ChB (Edinburgh), FRCS(C) FACS, Assistant Clinical Professor of Obstetrics & Gynaecology (1952, 1959).

FRIEDMAN, Morris Harold Weinlos, BSc MD MSc (Alberta), Instructor in Surgery (1962, 1964).

FRIED, Charles Tear, BSc (New York), MD (American University, Beirut), FAAP, Clinical Instructor of Paediatrics (1968, 1968).

FRIESEN, Abram J. D., BS, MA (British Columbia), PhD (Utah), Associate Professor of Pharmacology (1968, 1968).

FRIESEN, David, BA BPaed MEd (Manitoba), PhD (N. Dakota), Associate Professor of Educational Administration (1966, 1967).

FROST, Miss Elizabeth Anne, BSc (Alberta), MS (Utah State), Lecturer in Household Economics (1968, 1968).

FRUCHT, Richard, BA (Brooklyn), MA PhD (Brandeis), Assistant Professor of Anthropology (1966, 1966).

FUERST, Heinrich Julius-Rudolf, MD (Munich), DPM (McGill), Clinical Professor in Psychiatry (1961, 1961).

FULLER, William Albert, MA (Saskatchewan), PhD (Wisconsin), Professor of Zoology (1959, 1967).

GADS, Leonard Eustace, BSc (Alberta), Professor and Associate Dean of Engineering (1949, 1964).

GAIN, Edward Alexander, BA MD (Alberta), FACA, Professor and Head of Anaesthesia (1949, 1967).

GAINER, Walter Dunham, BSc (Alberta), MS (Iowa State) PhD (Massachusetts Institute of Technology), Professor and Head of Economics (1950, 1964).

GALLAGHER, James Emmett, MEd (Alberta), Associate Professor of Industrial and Vocational Education (1963, 1967).

GANDER, Thomas Alfred, MD (Alberta), Clinical Professor of Paediatrics (1950, 1965).

GANS, Leo John, BSc MD (Alberta), FACOG, Instructor in Obstetrics and Gynaecology (1959, 1963).

GARBRAH, Kweku A., BA (London External at Ghana University), Dip.Comp.Phil., BLitt (Oxon.), Assistant Professor of Classics (1968, 1968).

GARFINKLE, Harry, BA (Sir George Williams), MA PhD (Columbia), Associate Professor of Educational Foundations (1966, 1966).

GARFINKLE, Mrs. Mary Schults, BSc, MA (Columbia), Assistant Professor of Romance Languages (1966, 1967).

GARG, Krishna M., MSc PhD (Lucknow), Associate Professor of Mathematics (1966, 1967).

GATHE, Mrs. Janette, MSc (Western Australia), Lecturer in Botany (1966, 1966).

GAU, Daniel Joseph, DDS (Alberta), Assistant Professor of Dentistry (1967, 1967).

GAUK, Ehor William, BSc MD (Manitoba), Instructor in Paediatrics (1964, 1964).

GAUNCE, Mrs. Joan E., BSc (St. Andrews), Sessional Lecturer in Physiology (1964, 1964).

GEDDES, John Gordon, DDS (Alberta), Sessional Lecturer in Dentistry (1962, 1962).
GEERE, Ian, MB ChB (Leeds), Lecturer in Bacteriology (1967, 1967).
GEHLERT, Mrs. Gloria Catherine, RN (University of Alberta Hospital) BSc (Alberta), Lecturer in Nursing (1968, 1968).
GELDART, Stanley Gordon, DDS (Alberta), Associate Professor in Dentistry (1958, 1960).
GHURYE, Sudhish G., MSc (Bombay), PhD. (N. Carolina), Professor of Mathematics (1968, 1968).
GIBB, George Hildon, BSc DDS (Alberta), Associate Professor and Head of Restorative Dentistry (1959, 1961).
GIBBARD, Miss Margaret Helena, BSc (British Columbia), Dietitian, Athabasca Hall (1963, 1963).
GIBBS, John Theodore, BA MB BChir MB (Cantab.), Assistant Professor of Psychiatry (1962, 1963).
GILBERT, James Alan Longmore, MB ChB MD FRCP (Edinburgh), FRCP(C) MRCP (London), Professor of Clinical Medicine (1950, 1963).
GILL, Don Allyn, BS (N. Michigan), MA (California), Assistant Professor of Geography (1968, 1968).
GILLES, John William, MA MEd (Alberta), EdD (Stanford), Professor of Educational Psychology, Director of Summer Session and Evening Credit Program (1945, 1955).
GILSDORF, Robert Raymond, BIE (Ohio State), MA (Yale), Assistant Professor of Political Science (1964, 1964).
GINSBURG, Norman M., AM PhD (Chicago), Associate Professor of Psychology (1966, 1966).
GIROUX, Leo L., MD (Alberta), Instructor in Surgery (1960, 1964).
GLASSFORD, Robert Gerald, BPE (British Columbia, MA (Alberta), Assistant Professor of Physical Education (1965, 1965).
GODFREY, Denis Rowley, BA PhD (Dublin), Professor of English (1950, 1967).
GOLDSAND, George, MD (Alberta), Assistant Professor of Medicine and Bacteriology (1963, 1967).
GOODALE, Denis, BCom (Saskatchewan), MBA (Washington), CA RIA, Associate Professor of Business Administration and Commerce (1950, 1955).
GOODING, Ronald Harry, BSc (Alberta), MA (Rice), ScD (Johns Hopkins), Assistant Professor of Entomology (1966, 1966).
GOODMAN, Miss Yvonne Elizabeth, MSc (Alberta), Lecturer in Bacteriology and Assistant Bacteriologist, Provincial Laboratory (1959, 1965).
GORDON, Miss Moyna Jeannette, MCSP (Liverpool), Assistant Professor of Rehabilitation Medicine (1954, 1967).
GORT, John, BSc MD (Alberta), Instructor in Surgery (1964, 1965).
GOTAAS, Paul Bjarne, DDS (Alberta), Sessional Lecturer in Dentistry (1964, 1964).
GOUD, Paul Arie, BSc (Alberta), MASc PhD (British Columbia), Associate Professor of Electrical Engineering (1966, 1968).
GOUGH, D. Ian, MSc (Rhodes), PhD (Witwatersrand), Professor of Physics (1966, 1966).
GOURISHANKAR, Vembu, BE (Madras), MS PhD (Illinois), Associate Professor of Electrical Engineering (1965, 1965).
GRAHAM, William Arthur Grover, MA (Saskatchewan), PhD (Harvard), Professor of Chemistry (1962, 1967).
GRAHAM, William Hugh, MD MCh BAO (Belfast), Instructor in Anaesthesia (1959, 1966).
GRANT, Raymond James S., MA (Aberdeen), Assistant Professor of English (1967, 1967).
GREEN, Leslie Claude, LLB (London), Professor of Political Science (1965, 1965).
GREENE, Edward Joseph Hollingsworth, MA (Alberta), DU (Paris), Professor of French and Associate Dean of Arts (1938, 1967).
GREENHILL, Brian John, MRCS(E), LRCP(L), FRCS(C), Instructor in Surgery (1964, 1966).
GREENHILL, Hon. Stanley, MD DPH (Toronto), Professor and Head of Community Medicine, Consulting Physician, Student Health Service 1947, 1959).
GRIEVE, Clarence Melross, BSA MSc (Manitoba), PhD (Alberta), Assistant Professor of Animal Science (1964, 1964).
GRIFFIN, Ernest George, BSc AM PhD (Columbia), Associate Professor of English (1963, 1965).
GRLICA, George MA (Indiana), Librarian (1966, 1966).
GRISDALE, Lloyd Carl, BSc MD (Alberta), Professor and Assistant Dean of Medicine for Professional and Community Affairs (1951, 1967).
GUE, Leslie Robb, BEd PhD (Alberta), BSW (British Columbia), Associate Professor of Educational Administration (1966, 1966).
GUILD, Julius, BSc MD (Alberta), DPM (London), Associate Professor of Psychiatry (1957, 1966).
GULLEKSON, Clifford Leslie, DDS (Alberta), Sessional Lecturer in Dentistry (1962, 1962).
GULLEY, John Lewis, MD (Toronto), Lecturer in Orthopaedic Surgery (1959, 1961).
GULUTSAN, Metro, BA BEd (Saskatchewan), PhD (California), Associate Professor of Educational Psychology (1962, 1964).
GUNNING, Harry Emmet, MA PhD (Toronto), FRSC, Professor and Head of Chemistry, Killam Memorial Professor of Chemistry (1957, 1957).
GUPTA, Kanhaya L., MA (Delhi), PhD (Toronto), Assistant Professor of Economics (1968, 1968).
GUPTA, Ram Krishna, BSc MEd (Allahabad) MA (London), PhD (Minnesota), Assistant Professor of Educational Psychology (1965, 1965).
HACKETT, Roger Michael, BA MB (Dublin), FRCS (Edinburgh), FRCS(C), Instructor in Surgery (1966, 1966).
HACKLER, James Courtland, BS (California), Associate Professor of Sociology (1965, 1968).
HADDOW, James Baird, BSc (St. Andrews), MS (Alberta), PhD (Manchester), Professor of Mechanical Engineering (1955, 1965).
HAGE, Keith D., BA (British Columbia), MA (Toronto), PhD (Chicago), Professor of Geography (1967, 1967).
HAGEN, Mrs. Eva Odette, MB ChB (Manchester), Assistant Professor of Anatomy (1959, 1961).
HAGEN, John Martin, MB ChB (Edinburgh), Instructor in Anaesthesia (1963, 1965).
HAGER, Raymond Benjamin, DDS (Alberta), Part-time Lecturer in Dentistry (1961, 1963).
HALEY, Frank Cecil, MSc MD (Alberta), Assistant Clinical Professor of Anaesthesia (1960, 1967).
HALL, Miss Margaret Ann, BA, BPHE (Queen's), Lecturer in Physical Education (1968, 1968).
HALL, William Francis Melville, BA MD (Alberta), FRCS(C), Assistant Clinical Professor of Surgery (1951, 1964).
HALLETT, Peter Edward, BSc MA BM (Oxon.), Assistant Professor of Physiology (1965, 1965).
HAMEED, Syed M. A., FA (Khyber), BA MS (Punjab), FEL (Karachi), PhD (Wisconsin), Associate Professor of Business Policies (1968, 1968).
HAMILTON, Miss Dorothy Isabel, BA (Alberta), BSc (Washington), MA (Michigan), Head of Rare Books and Archives (1929, 1963).
HAMMOCK, Virgil, BFA (San Francisco Art Institute), MFA (Indiana), Assistant Professor of Art (1967, 1968).
HAMPSON, Cyril G., BA PhD (Alberta), Professor of Secondary Education (1952, 1967).
HAMPTON, Alexander, MS (Sydney), PhD (London), Associate Professor of Biochemistry (1963, 1963).
HAMPTON, Mrs. Esmeralda Gambetta, BSc PhD (Buenos Aires), Lecturer in Bacteriology (1965, 1965).
HAMULA, Edward Vincent, BSc (Alberta), Director of Public Relations (1967, 1967).
HANSON, Eric John, BA (Queen's), MA (Alberta), PhD (Clark), FRCS, Professor of Political Economy (1946, 1956).
HANSON, Samuel, MD (Alberta), FCAP, Associate Professor of Pathology (1948, 1960).
HARDIN, Robert Toombs, BSA (Georgia) MS PhD (Purdue), Associate Professor of Animal Science (1962, 1967).
HARDY, Albert William, MD (Alberta), FRCS(C), FACS, Assistant Clinical Professor of Surgery (1940, 1954).
HARDY, James John, DDS (Alberta), Lecturer in Dentistry (1962, 1964).

HARDY, Robert Macdonald, BSc DSc (Manitoba), MSc (McGill), FRCS FEIC, Dean of Engineering (1930, 1947).
HARGREAVES, Henry Allen, MA (Mount Allison), PhD (Duke), Associate Professor of English (1963, 1968).
HARLEY, William Thomas, BSc DDS (Alberta) MSD (Washington), Associate Professor of Dentistry (1967, 1967).
HARNDEN, Boyd M., Geological Engineer (Colorado School of Mines), MBA (Northwestern), Associate Professor of Business Analysis (1968, 1968).
HARRIES, Hubert William, BSc (Alberta), MS PhD (Iowa) MA (Toronto), Professor of Business Administration and Commerce (1959, 1968).
HARRINGTON, Miss Betty Nanette Nixon, BNursing (McGill), Assistant Professor of Nursing (1961, 1967).
HARRIS, Mrs. Dorothy Jean, BA (Alberta), Lecturer in Physical Education (1965, 1965).
HARRIS, Walter Edgar, MSc (Alberta) PhD (Minnesota), Professor of Chemistry (1946, 1962).
HARRISON, H. Page, BSc (Saskatchewan), Asociate Professor of Agricultural Engineering (1966, 1967).
HARRISON, Richard Terrence, MA (British Columbia), Lecturer in English (1967, 1967).
HARVEY, Ted G., BA (Florida State), MA (Hawaii), Assistant Professor of Political Science 1968, 1968).
HARYETT, Rowland Dalton, DDS MScD (Toronto), Professor of Orthodontic Dentistry (1954, 1966).
HASSARD, Donald Thomas Robert, BSc MD (Alberta), Sessional Instructor in Surgery (1963, 1963).
HAWES, Harold Richard, BSc (Alberta), Graduate Registrar (1953, 1964).
HAWKINS, Murray, BSA (Guelph), MSc (Alberta), Assistant Professor of Agricultural Economics (1966, 1966).
HAWRYSH, Mrs. Zenovia Jean, BSc (Alberta) MS (Michigan State), Assistant Professor of Household Economics (1960, 1962).
HAYNES, Ernest Reginal Daunt, MA MB BCh BAO (Trinity College, Dublin), Assistant Professor, Family Care Unit, Community Medicine (1963, 1967).
HAYS, Peter, MB BS (London), Associate Professor of Psychiatry (1967, 1967).
HAYWARD, John Stanley, BSc PhD (British Columbia), Assistant Professor of Zoology (1965, 1965).
HEAD, Ivan Leigh, BA LLB (Alberta) LLM (Harvard), Professor of Law (1963, 1967).
HEAPS, Mrs. Doreen Mary, BA (Dalhousie), MA (British Columbia), Assistant Professor of Computing Science (1967, 1967).
HEAPS, Harold Stanley, BSc (Manchester), MA (Toronto), Professor and Assistant Head of Computing Science (1967, 1967).
HEATH, Charles, MSc (Alberta) PhD (Minnesota), Associate Professor of Physiology (1949, 1958).
HEBB, Harvey Douglas, BSc MD CM (Dalhousie), Sessional Instructor in Surgery (1957, 1957).
HEENEY, William Brian Danforth, BA (Toronto), BD (Episcopal Theological School, Cambridge, Mass.), DPhil (Oxon), Associate Professor of History (1962, 1967).
HELLON, Charles Patrick, MB ChB (Edinburgh) DPM (London), Assistant Professor in Psychiatry (1966, 1968).
HEMING, Bruce Sword, BSA (Guelph), PhD (N. Carolina State), Assistant Professor of Entomology (1968, 1968).
HENDERSON, Joseph Franklin, MS (Arizona), PhD (Wisconsin), Professor of Biochemistry (1963, 1968).
HENDERSON, Robert Selby, MRCS (England), FRCP (London), FRCS (England), FRCS(C) FACS, Instructor in Orthopaedic Surgery (1957, 1957).
HENDERSON, Mrs. Ruth McClintock, MS PhD (Minnesota), Assistant Professor of Pharmacology (1963, 1968).
HENDIN, Irvine Donald, BSc MD (Manitoba), Lecturer in Radiology (1961, 1964).
HENDRICKSON, Miss Mary Pauline, BA BPE (Alberta), MA (Ohio State), PhD (Chicago), Assistant Professor of Sociology and Community Medicine (1966, 1966).
HERBERT, Frank Alexander, MD MSc (Manitoba), FRCP(C), Instructor in Clinical Medicine (1964, 1964).
HERGOTT, Clifford William, BSc MD (Alberta), Instructor in Community Medicine (1963, 1966).
HERMANSEN, Gustave, MA PhD (Copenhagen), Associate Professor of Classics and History (1965, 1966).
HETT, Robert Ralph, BA (W. Ontario), Assistant Professor of History (1965, 1965).
HICKS, David Clark, MA BD (Glasgow), PhD (Edinburgh), Associate Professor of Philosophy (1966, 1966).
HICKSON, David John, MSc Tech. (Manchester), Visiting Professor in Business Administration and Commerce (1968, 1968).
HILL, James Ross, BSP MD (Saskatchewan), Sessional Demonstrator in Clinical Pathology (1965, 1965).
HILLER, Walter Andrew, BSc (Alberta), Campus Development Officer (1967, 1967).
HININGS, Christopher Robin, BA (Leeds), Visiting Associate Professor of Business Administration and Commerce (1968, 1968).
HIRABAYASHI, Gordon Kiyoshi, MA PhD (Washington), Professor and Head, Department of Sociology (1959, 1964).
HIRD, Miss Susan Mary, BA (Dunelm.), MA (Illinois), Lecturer in Germanic Languages (1966, 1967).
HIRUKI, Chuji, BS PhD, Assistant Professor of Plant Pathology and Plant Science (1966, 1966).
HITCHIN, Edward, MD (Alberta), Assistant Clinical Professor of Surgery (1939, 1965).
HLYNKA, John Nicholas, BSc (Alberta) MSc (Philaedlphia College of Pharmacy) PhD (Alberta), Assistant Professor of Pharmacy (1963, 1967).
HNATKO, Stephen Ian, BSc MD (Alberta), MA (Toronto), Sessional Lecturer in Bacteriology (1959, 1959).
HOARE, Harold J., BA (Toronto), Counsellor, Student Counselling Service (1966, 1967).
HOBART, Charles Warren, BA (Redlands) MA (S. California), PhD (Indiana), Professor of Sociology (1962, 1968).
HOBBS, Brian Eric, BA (Alberta) BLS (McGill), Librarian (1965, 1965).
HOCKING, Brian, BSc PhD (London), MSc (Alberta), ARCSc, Professor and Head of Entomology (1946, 1956).
HODGINS, Miss Barbara Louise, BA (Alberta), Lecturer in Economics (1967, 1967).
HODGSON, Ernest Daniel, MEd PhD (Alberta), Professor of Educational Administration (1966, 1966).
HODYSH, Henry William, MEd (Alberta), Assistant Professor of Educational Foundations (1967, 1967).
HOGGE, Harvey Leslie, BSc (Alberta), Lecturer in Preventive Medicine (1953, 1953).
HOHENBALKEN, Balder von, MA (Munich), PhD (Vienna), Associate Professor of Economics (1967, 1967).
HOHN, Emil Otto, MB BS MSc PhD (London), MRCS, Associate Professor of Physiology (1947, 1952).
HOLDAWAY, Edward, BSc, BEd MEd (Melbourne), Special Lecturer in Educational Administration (1968, 1968).
HOLDEN, Miss Anita June, BA (London), MA (McMaster), Assistant Professor of French (1964, 1966).
HOLMES, Clarence Edward, BA MD (Alberta), Lecturer in Radiology (1956, 1966).
HOLMES, Ian, MB, ChB (Edinburgh), Assistant Professor of Anatomy (1968, 1968).
HOLMES, John Carl, BA (Minnesota) MA PhD (Rice), Associate Professor of Zoolgy (1959, 1964).
HOO, Cheong Seng, MSc (Auckland), PhD (Syracuse), Associate Professor of Mathematics (1965, 1968).
HOOPER, Roland Charles Wilkins, Diploma of Graduation (Royal Military College), Dean of Men (1960, 1964).

HOOZ, John, BS (Brooklyn College), PhD (Purdue), Assistant Professor of Chemistry (1965, 1965).

HOPKYNS, John Creasey Wykeham, BA MD (Oxon.), MRCP (London), Clinical Lecturer in Medicine (1953, 1968).

HORNER, Ronald Hilborn, MD (Alberta) FACS DABOG FRCOG FACOG, Clinical Professor of Obstetrics and Gynaecology (1939, 1957).

HOSKINS, Colin George, BA (Manchester), Assistant Professor of Business Administration and Commerce (1966, 1966).

HOUGH, Arthur John Bates, MA (W. Ontario), Licentiate in Theology (St. John's College, Winnipeg), Associate Professor of Psychology, Counsellor and Director of Student Counselling Services (1955, 1964).

HOWARTH, Edgar, MSc (Manchester) PhD (Melbourne), Professor of Psychology (1960, 1968).

HOWELL, Miss Marjorie Jean, BA (Victoria), BLS (British Columbia), Librarian (1966, 1966).

HOWELL, Maxwell Leo, MA EdD (California), Professor of Physical Education (1961, 1963).

HUCKELL, John Richmond, BSc (Alberta), MD CM (McGill), FRCS(C), Instructor in Orthopaedic Surgery (1959, 1961).

HUGHES, David Gwyn, BSc PhD (Wales), Associate Professor of Physics (1965, 1965).

HUGHES, Robert H., MA (Colorado), Assistant Professor of Sociology and Education Foundations (1967, 1967).

HULMES, Frederick George, MA (Alberta), Assistant Professor of Political Science (1965, 1965).

HUNKA, Stephen Mirosko, MEd (Alberta), PhD (Illinois), Professor of Educational Psychology and Director of Educational Research (1961, 1965).

HUNTER, Edward Frederick, BCom (Alberta), Purchasing Agent (1948, 1948).

HUSEL, Donald Harold, BSc MD (Alberta), FACOG, Lecturer in Obstetrics and Gynaecology (1958, 1963).

HUSTON, Mervyn James, MSc (Alberta), PhD (Washington), FCIC, Professor and Dean of Pharmacy (1940, 1955).

HUTCHINGS, Frederick George, MA (Honorary) (Leeds), Visiting Professor, School of Library Science, (1968, 1968).

HUTTER, Horst H., MA (New York), Visiting Assistant Professor, Political Science (1968, 1968).

HUTTON, Miss Margaret MacSteven, BA MD (Alberta), FRCS(C) FACS FACOG, Assistant Clinical Professor of Obstetrics & Gynaecology (1944, 1957).

HUZINAGA, Sigeru, BSc (Kyushu), DSc (Kyoto), Visiting Professor of Chemistry (1968, 1968).

HYDE, Harry Alexander, MD (Toronto), FRCS(C), Instructor in Surgery (1960, 1962).

HYNAM, Charles Arthur Sylvester, MS PhD (Cornell), Associate Professor of Sociology and Agricultural Economics (1962, 1967).

HYNDMAN, Charles Frederick, MD CM (Queen's), Assistant Clinical Professor in Radiology (1963, 1963).

HYRAK, Wasyl, Mluris Dlur (Ukrainian University, Munich), BLS (McGill), Librarian (1962, 1962).

IGARASHI, Satomi, MSc PhD (Tohoku), Assistant Professor of Biochemistry (1968, 1968).

ILTIS, John L., BMus (Wisconsin), MMus (Michigan), Assistant Professor of Music (1968, 1968).

INOUE, Fumitake, MD (Hokkaido), PhD (Tokyo), Assistant Professor of Pharmacology (1965, 1965).

IRONSIDE, Robert Geoffrey, BA PhD (Dunelm.), Assistant Professor of Geography (1963, 1963).

IRVING, David Walter, MD (Alberta), Instructor in Medicine (1965, 1965).

ISRAEL, Werner, MSc (Cape Town), PhD (Dublin), Professor of Mathematics (1958, 1968).

JACKA, Reginald Charles, BSc (Alberta), MSc (Chicago), Associate Professor of Mathematics and Assistant Dean, Faculty of Science (1954, 1964).

JACKSON, Dennis Edward, BSc PhD (Dunelm.), Associate Professor of Geology (1962, 1966).

JACKSON, Francis Leslie, MRCS (Eng.), LRCP MB BS DipBact (London), Professor and Head of Bacteriology (1966, 1966).

JACKSON, Harold, MSc (Nottingham), PhD (Alberta), Assistant Professor of Food Science (1963, 1963).

JACKSON, Mrs. Margaret Murray, RN, BASc (British Columbia), MPH (Michigan), Associate Professor of Nursing (1957, 1964).

JACOBS, Harold, BSc MMed (Cape Town), MB BChir MA (Cantab.), FRCP(C), Assistant Clinical Professor in Medicine (1965, 1965).

JACOBS, John Arthur, MA PhD DSc (London), Killam Memorial Professor of Science (1967, 1967).

JAHANGIR, Mohammed, BA (Allahabad), MA (Karachi), MA (Indiana), Librarian, (1968, 1968).

JAMES, Christopher Robert, MASc PhD (British Columbia), Associate Professor of Electrical Engineering (1965, 1965).

JAMES, Miss Janice, BPE (Alberta), Lecturer in Physical Education (1967, 1967).

JAMES, Michael N. G., MSc (Manitoba), PhD (Oxon.), Assistant Professor of Biochemistry (1968, 1968).

JAMIESON, Mrs. Marianne, BA (Alberta), BLS (British Columbia), Librarian (1967, 1967).

JAMPOLSKY, Noel Arran, BSc MD (Alberta), Instructor in Cilinical Medicine (1964, 1964).

JELLARD, Charles H., BA, BM, B.Ch. (Oxon.), Deputy Director, Provincial Laboratory of Public Health and Associate Professor of Bacteriology (1968, 1968).

JENKINSON, Mrs. Marion Ellen Dixon, BA (Manchester), PhD (Chicago), Professor of Elementary Education (1968, 1958).

JESPERSEN, Reuben Edward, BA MD (Alberta), Sessional Instructor in Surgery (1956, 1956).

JIMINEZ, Jose, BASc LMS (Madrid), Assistant Clinical Professor of Rehabilitation Medicine and Community Medicine (1963, 1968).

JOHNS, Walter Hugh, BA LLD (W. Ontario), PhD (Cornell), D ès L (Laval), President (1938, 1958).

JOHNSON, Denis Bruce, BA (British Columbia), MA (Alberta), Assistant Professor of Geography (1966, 1966).

JOHNSON, Eric William, BSc (London), Assistant Professor of Mechanical Engineering (1958, 1958).

JOHNSON, Leroy Peter Vernon, MSc (Alberta), PhD (Washington State), Professor of Genetics (1948, 1950).

JOHNSON, Victor, BFA (Texas), Assistant Professor in Art (1967, 1968).

JOHNSON, Noel William, BA (Nevada) BLS (California), Co-ordinator of Systems Planning and Development for Library (1967, 1967).

JOHNSTON, Donald Cooper, MD (Alberta), FRCS(C), Lecturer in Orthopaedic Surgery (1951, 1951).

JOHNSTON, J. Paul, MA (N. Carolina), Assistant Professor of Political Science (1967, 1967).

JOHNSTON, Robert James, MD (Alberta), FRCS(C), Assistant Clinical Professor of Surgery (1953, 1953).

JONES, Frank Douglas, BA (Alberta), LLB (Dalhousie), LLM (Toronto), Associate Professor of Law (1965, 1966).

JONES, Miss Hazel J., BA (Siena Heights), MA (Michigan, Toronto), Assistant Professor of History (1967, 1967).

JONES, Mrs. Margaret, BEd (Alberta), Assistant Professor in Household Economics (1967, 1968).

JONES, Melvin David, DDS (Alberta), Assistant Professor of Dentistry (1966, 1966).

JONES, Theodore Evan, DDS (Alberta), Lecturer in Dentistry (1963, 1963).

JONES, William John, BA PhD (London), Associate Professor of History (1961, 1965).

JONYS, Miss Birute Regina, MA (Toronto), PhD (Chicago), Counsellor, Student Counselling Service (1967, 1967).

JOPLING, William Harvey, BSc (Alberta), Co-ordinator, Technical Services (1966, 1966).

JORDAN, Robert Beatty, BSc (W. Ontario), PhD (Chicago), Assistant Professor of Chemistry (1965, 1965).

JUDGE, David Lawrence Crawford, BSc MD (Alberta), FRCP(C), Assistant Clinical Professor of Medicine and Pathology (1959, 1964).

KALANTAR, Alfred Husayn, BS (Rutgers), PhD (Cornell), Assistant Professor of Chemistry (1964, 1964).

KALINOWSKY, Michel, Dip. (Ecole Supérieure de Commerce, Paris), MA (Alberta), Assistant Professor of French (1963, 1965).

KAMAL, Abdul Naim, MSc (Dacca), PhD (Liverpool) Associate Professor of Physics (1964, 1968).

KANASEWICH, Ernest Raymond, MSc (Alberta), PhD (British Columbia), Associate Professor and Assistant Chairman, Department of Physics (1963, 1967).

KANE, Edward William Scott, BA LLB (Alberta), Associate Professor and Secretary of the Faculty of Law (1966, 1966).

KANTAUTAS, Adam, BCom (Copenhagen), MLS (Washington), Library Assistant (Orders) (1960, 1960).

KARPINSKI, Edward, MSc (Alberta), Lecturer in Physiology (1967, 1967).

KASPER, Thaddeus Alphonsus, BSc MD (Alberta), Associate Professor of Pathology (1961, 1964).

KATZ, Martin, AB (Stanford), MA PhD (California), Assistant Professor of History (1962, 1962).

KAUFMAN, Abraham, AB (Chicago), AM (Roosevelt), EdD (Harvard), Associate Professor of Educational Foundations (1967, 1967).

KAY, Cyril Max, BSc (McGill), PhD (Harvard), Professor of Biochemistry (1958, 1967).

KEBARLE, Paul, DipIng (Zurich), PhD (British Columbia), Professor of Chemistry (1958, 1963).

KELEMEN, Andor, MD (Pecs), Honorary Instructor in Community Medicine (1963, 1966).

KELLEY, Michael Harry, MA (Wisconsin), Assistant Professor of Philosophy (1966, 1966).

KELLUM, David Franklin, BS (Holy Cross College), MA EdD (Columbia), Associate Professor of Secondary Education (1967, 1967).

KELLY, Daniel, MD (Dublin), Honorary Sessional Instructor Community Medicine (1964, 1964).

KELLY, Donald Harry, MSc (Alberta), Associate Professor of Electrical Engineering (1958, 1963).

KELLY, Thomas, BA (Penn. State), AM PhD (Illinois), Assistant Professor of Classics (1966, 1966).

KEMP, Edward Wilson, BEd MA (Alberta), Assistant Professor of Philosophy (1964, 1964).

KENNEDY, Henry Albert, BCom (McGill), MBA (W. Ontario), CA (Quebec), Assistant Professor of Business Administration and Commerce (1965, 1965).

KENNEDY, James Stewart, MSc (Alberta), PhD (Stanford), Professor of Mechanical Engineering (1955, 1955).

KENNEDY, Miss Lorene Louise, MSc (Alberta), PhD (Iowa), Professor of Botany (1964, 1965).

KENNESON, Claude Emile, MMus (Texas), Assistant Professor of Music (1965, 1965).

KEOGH, Richard Keven, BSc (St. Francis Xavier), MD, CM (McGill), Instructor in Radiology (1966, 1966).

KEOHANE, John Thomas F., MB, BCh. (University College, Dublin), MCh (National University of Ireland) (1966, 1966).

KERR, Miss Nancy, BHSc (Toronto), MSc (California), Assistant Professor of Household Economics (1966, 1966).

KHETARPAL, Suraj Parkash, BSc (Punjab), BL (Rangoon), LLM PhD (London), Associate Professor of Law (1965, 1965).

KIDD, Edward Garland, BSc MD (Alberta), Lecturer in Medicine (1952, 1957).

KIEREN, Thomas E., BA (Minnesota), MA (Northwestern), Assistant Professor of Secondary Education (1967, 1967).

KIMMITT, Patrick John, BSc MD (Alberta), Instructor in Paediatrics (1958, 1959).

KING, Robert William, BSc (Alberta), Assistant Professor of Electrical Egineering (1947, 1955).

KING-FARLOW, John, BA (Oxon.), MA (Duke), PhD (Stanford), Visiting Professor in Philosophy (1968, 1968).

KINGMA, Ynte Jacob, NatIng (Delft), Professor of Electrical Engineering (1958, 1968).

KIRMAN, Joseph M., BA (Brooklyn College), MA, PhD (New York), Associate Professor of Elementary Education (1968, 1968).

KLAWE, Janusz Josef, DipCom (Grenoble), MA (Glasgow), Professor of Geography (1963, 1968).

KLAWE, Mrs. Kathleen Wreath, MA (Glasgow), Assistant Professor of Economics (1964, 1968).

KLING, Samuel, BA (Saskatchewan), MD (Toronto), FRCS(C), Assistant Clinical Professor of Surgery (1951, 1960).

KNIGHT, Philip Leigh, MA (Victoria, New Zealand), Lecturer in Romance Languages (1967, 1968).

KNILL, William Douglas, BEd (Alberta), MA (Montana State), EdD (Oregon), Professor of Educational Administration (1962, 1967).

KNOWLER, Albert Stephen, BCom (Alberta), Chief Accountant (1954, 1968).

KNOWLES, Robert Hugh, BSA (Toronto), MSc (Alberta), Associate Professor of Horticulture and Superintendent of Grounds (1948, 1954).

KNOWLTON, Jonathan, BA (Yale), MA (California), Assistant Professor of Art (1966, 1966).

KOPECKY, Karl Rudolph, BSc (Iowa State), PhD (California), Assistant Professor of Chemistry (1961, 1961).

KORNELL, Simon, MB BCh (Witwatersrand), FCP(SA), FRCP(C), Clinical Lecturer in Medicine (1962, 1967).

KOTRC, Ronald Fred, BA (Nebraska), MA (Washington), Assistant Professor of Classics (1964, 1966).

KOWALEWSKI, Konstanty Piotr, MPhil (Warsaw), DPhil MD (Brussels), Professor of Experimental Surgery (1955, 1967).

KOZIEY, Paul W., MS (N. Dakota), PhD Wyoming), Assistant Professor of Educational Psychology (1967, 1967).

KRATOCHVIL, Byron George, MS, PhD (Iowa State), Associate Professor of Chemistry (1967, 1967).

KREISEL, Henry, MA (Toronto), PhD (London), FIAL, Professor of English and Associate Dean, Faculty of Graduate Studies (1947, 1967).

KROUSE, Howard Roy, BSc PhD (McMaster), Associate Professor of Physics (1960, 1965).

KROTKI, Karol, MA (Cantab.), MA PhD (Princeton), Professor of Sociology (1968, 1968).

KUPFER, George, BA (Seattle Pacific), MA PhD (Washington), Associate Professor of Sociology (1964, 1968).

KUSPIRA, John, BSA MSc (Saskatchewan), PhD (Alberta), Professor of Genetics (1963, 1966).

KYLE, William Donald, BSc MD (Alberta), Honorary Instructor in Anaesthesia (1960, 1960).

LAKEY, William Hall, BSc MD (Alberta), FRCS (C), Associate Professor of Surgery (1960, 1964).

LAMBLE, Gordon Wayne, MSc (Alberta), Assistant Professor, Department of Extension (1968, 1968).

LANE, Arnold H., DDS (McGill), Sessional Lecturer in Dentistry (1961, 1961).

LANE, Byron George, BA PhD (Toronto), Associate Professor of Biochemistry (1961, 1967).

LANE, Miss Patricia Aletha, BEd (Saskatchewan), MA PhD (Minnesota), Associate Professor of Elementary Education (1965, 1967).

LA ROI, George Henri, BA (Lake Forest College), MA PhD (Duke), Associate Professor of Botany (1963, 1963).

LARSEN, Donald Erik, BA (Minnesota), MA (Indiana), PhD (Yale), Assistant Professor of Sociology and Community Medicine (1964, 1966).

LARSON, Lyle Eugene, BA (Bethel College), Assistant Professor of Sociology (1968, 1968).

LASKIN, Manual Mervin, BA (Saskatchewan), MD (Toronto), FRCS(C), Assistant Clinical Professor (1959, 1965).

LAUBER, John Francis, MA PhD (Washington), Associate Professor of English (1965, 1967).

LAUBER, Mrs. Jean Kautz, BA (Whitman College), MA (Washington, St. Louis), PhD (New Mexico), Assistant Professor of Zoology (1965, 1965).

LAURENSON, Rae Duncan, MB ChB MD (Aberdeen), Professor of Anatomy (1963, 1968).

LAUX, Frederick Albert, BA LLB (Alberta), Assistant Professor of Law, (1968, 1968).

LAWSON, Ronald P. W., BEng PhD (Liverpool), Assistant Professor of Electrical Engineering (1967, 1967).

LAYCHUK, Julian Louis, BA MA (Alberta), Assistant Professor in Russian (1962, 1964).

LAYCOCK, Arleigh Howard, BA (Toronto), PhD (Minnesota), Professor of Geography (1955, 1967).

LeBLANC, Darrell Robert, BA (New Brunswick), Assistant Professor in Vocational and Industrial Education (1966, 1968).

LEE, Charles Adam, MBA (North Texas State), Associate Professor of Business Administration and Commerce (1962, 1962).

LEE, Mrs. Catherine Shiao-ning, MB (National Taiwan), Lecturer in Paediatrics (1965, 1965).
LEE, Simon Jong Koo, MD (Seoul National), FRCP(C), Assistant Professor of Medicine (1965, 1968).
LEEDER, James Richard, BSc MD (Alberta), FACOG Instructor in Obstetrics and Gynaecology (1953, 1956).
LEESON, Thomas Sydney, MA MB BChir MD (Cantab.), Professor and Head of Anatomy (1963, 1963).
LEFEBVRE, Charles E., BA (Laval), MD (Alberta), Lecturer in Medicine (1942, 1960).
LEFEBVRE, Miss Verna Mary, BA BSc (Saskatchewan), BEd (Alberta), MSc (Montana State), Assistant Professor of Household Economics (1966, 1966).
LEFRANCOIS, Guy Ronald, MEd (Saskatchewan), PhD (Alberta), Assistant Professor of Educational Psychology (1966, 1966).
LEGRIS, Maurice Roger, BA BPhil (Ottawa), MA (N. Carolina), Assistant Professor of English (1968, 1968).
LEITCH, Lorne Campbell, LLB (Manitoba), MBA (Chicago), Associate Professor of Business Administration and Commerce (1961, 1961).
LEJANO, Ernesto Barrios, BMus (Santo Tomas), Master of Music Literature, Doctor of Music Arts, Performance and Pedagogy (Eastman School of Music), Assistant Professor of Music (1967, 1967).
LEJNIEKS, Juris A., BA (Chicago), MA (Washington), Assistant Professor of Political Science (1968, 1968).
LEMIEUX, Raymond Urgel, BSc (Alberta) PhD (McGill), Professor of Organic Chemistry (1961, 1961).
LERBEKMO, John Franklin, BASc (British Columbia), PhD (California), Associate Professor of Geology (1956, 1960).
LESINS, Karlis Adolfs, BAgr (Latvia), LicAgr (Sweden), DSc (Alberta), Professor of Genetics (1962, 1966).
LETTS, Harry Walter, BSc (Sir George Williams), MD (Ottawa), Lecturer in Pathology (1964, 1965).
LETTS, Thomas Blake, MD (Alberta), Sessional Instructor in Community Medicine (1964, 1964).
Le VANN, Leonard Jan, LRCP, LRCS (Edinburgh), LRFPS (Glasgow), Lecturer in Psychiatry (1958, 1958).
LEVERSEDGE, Miss Lillian Emily Mary, BA (Alberta), BLS (Toronto), Order Librarian (1946, 1947).
LEWIN, Victor, BA PhD (California), Associate Professor of Zoology (1958, 1964).
LIEBEL-WECKOWICZ, Mrs. Helen Pauline Grit, BA (Brooklyn), MA PhD (Northwestern), Associate Professor of History (1962, 1967).
LILGE, Ewald Oscar, MSc (Alberta), Professor and Head of Mining and Metallurgy (1936, 1954).
LINCOLN, Edward, LRSM (Royal School of Music), ARTC (Toronto), Assistant Professor of Music (1966, 1966).
LINKS, H., MB, BCh (Dublin), BA (Glasgow, Dublin), Instructor in Surgery, (1966, 1967).
LINTON, Neville Oswin, BCom (McGill), AM MALD PhD (Fletcher), Associate Professor of Political Science (1962, 1967).
LISTON, William Patrick, MB, BCh, BAO, ,(National University of Ireland), DMRD (London), Instructor in Radiology (1966, 1966).
LITEPLO, Donald Norman, BCom (Alberta), Associate Professor, Department of Extension (1967, 1967).
LITTLE, Adam Sharpe, MD (Manitoba), FRCP(C), Associate Professor of Medicine and Director, Continuing Medical Education (1956, 1967).
LIVESAY, Miss Dorothy, BA (Toronto), MEd (British Columbia), Assistant Professor of English (1968, 1968).
LLOYD, H. Alun, BA MD (Alberta), Instructor in Community Medicine (1963, 1967).
LOCK, Gerald Seymour Hunter, BSc, PhD (Dunelm.), Associate Professor of Mechanical Engineering (1962, 1964).
LOCKWOOD, Charles McDonald, BASc (Toronto), Dip Bus Adm (W. Ontario), Associate Professor and Assistant Director of Extension (1963, 1967).
LOCOCK, Robert Anthony, MSc (Toronto), PhD (Ohio State), Assistant Professor of Pharmacy (1965, 1965).
LOGIE, Miss Victoria Ann, BA (Calgary), Lecturer in Dental Hygiene (1967, 1967).
LOMBARD, James Benjamin, BFA (Texas), MA (Columbia Teachers College), Assistant Professor of Elementary Education (1967, 1967).
LONGLEY, Richmond Wilberforce, BSc (Acadia), AM EdM (Harvard), MA (Toronto), Professor of Geography (1959, 1967).
LONGWORTH, Jack, BSc (Alberta), MS (Illinois), Professor of Civil Enginering (1945, 1962).
LOVE, Harold Clyde, MS (Kansas State), PhD (Iowa), Professor of Agricultural Economics (1962, 1962).
LOWE, Cedric James, BA PhD (London), Professor of History (1968, 1968).
LOWIG, Henry Francis Joseph, DrRerNat (Prague), DSc (Tasmania), Professor of Mathematics (1957, 1967).
LOWN, James William, MSc, ARCS PhD DIC (London), Associate Professor of Chemistry (1962, 1968).
LUDWIG, Garry, BSc (Toronto), PhD (Brown) Assistant Professor of Mathematics (1966, 1966).
LUPTON, Miss Carolyn, BA (McMaster), BLS (Toronto), Librarian (Cataloguing) (1962, 1962).
LUPUL, Manoly Robert, BA BEd (Alberta), MA (Minnesota), PhD (Harvard), Associate Professor of Educational Foundations (1958, 1963).
MacARTHUR, Russell Stuart, MEd (Alberta), PhD (London), Professor of Educational Psychology (1955, 1959).
MACBETH, Robert Alexander Leslie, BA MD (Alberta), MSc (McGill), FRCS(C), FACS, Professor and Head of Surgery (1953, 1960).
MacDONALD, Mrs. Emma, BA (British Columbia), BLS (Toronto), Science Librarian (1949, 1951).
MacDOUGALL, Douglas Harvey, DDS (Toronto), Assistant Professor of Dentistry (1958, 1962).
MacGREGOR, Donald Gordon, DDS (Alberta), Associate Professor of Dentistry (1953, 1953).
MacGREGOR, James Grierson, BSc (Alberta), MS PhD (Illinois), Associate Professor of Civil Engineering (1961, 1963).
MacGREGOR, John Watt, BA MD (Alberta), FRCP(C) Professor and Head of Pathology (1932, 1951).
MacHARDY, Fenton Vincent, BE (Saskatchewan), MS (Northwestern), PhD (Edinburgh), Professor and Head Agricultural Engineering (1950, 1958).
MacINTYRE, Miss Jean Ann, BA (Bryn Mawr), MA PhD (Yale), Assistant Professor of English (1962, 1963).
MacKAY, David Allister, BA (St. Francis Xavier), MA (Toronto), PhD (Alberta), Associate Professor of Educational Administration (1965, 1966).
MacKENZIE, Bruce Munro, DDS (Alberta), Sessional Lecturer in Prosthetic Dentistry (1951, 1954).
MacKENZIE, Miss Margery Walker, BA BEd (Alberta), AM (Stanford), PhD (Cornell) Associate Professor of Classics (1947, 1964).
MacKENZIE, Walter Campbell, BSc MD CM Hon. LLD (Dalhousie), MS (Minnesota), FACS FRCS(C), Hon. FRCSEd (Surg. & Clin Surg.), LLD McGill, Hon. FRCS, Dean of Medicine (1939, 1959).
MACKI, Jack William, BSc (Idaho), PhD (California I. T.) Assistant Professor of Mathematics (1965, 1965).
MacKINNON, Clarence Stuart, BA (Bishop's), MA (Dalhousie), PhD (Toronto), Assistant Professor of History (1965, 1967).
MacLEAN, Hector Robertson, DDS (Alberta), FACD FICD, Dean of Dentisrty (1936, 1958).
MacLEAN, Mrs. Margaret Helen-Marie, BSc (Mount Allison and Columbia), Associate Professor and Director, School of Dental Hygiene (1961, 1967).
MACLEAN, William Alexander, MD (Manitoba), FRCS(C), Lecturer in Surgery (1958, 1964).
MACNAB, Ross B. J., BS (Michigan), MA PhD (Michigan State), Associate Professor of Physical Education (1963, 1965).
MacPHEE, Harry Douglas Malcolm, MB ChB (Edinburgh), Hon. Instructor in Social and Preventive Medicine (1963, 1964).

MacPHERSON, Alexander Donald, MD (Alberta), Assistant Clinical Professor (1947, 1955).

MacRAE, Patrick Daniel, DDS (Alberta), Associate Professor of Dentistry (1960, 1965).

MADSEN, Neil Bernard, MSc (Alberta), PhD (Washington, St. Louis), Associate Professor of Biochemistry (1962, 1962).

MAGUIRE, Thomas Owens, BSc MEd (Alberta), PhD (Illinois), Assistant Professor of Educational Psychology (1967, 1967).

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MAILLOUX, Barry James, MSc (Alberta), Assistant Professor of Computing Science (1967, 1967).

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MAMET, Henry, AB MA (Illinois), Director of Radio & Television (1967, 1967).

MANNING, Travis Warren, MS (Oklahoma State), PhD (Minnesota), Professor and Head, Agricultural Economics (1962, 1962).

MANUEL, Donald Windsor, BEd (Alberta), Sessional Lecturer in Vocational and Industrial Education (1966, 1966).

MARAHRENS, Gerwin Heinrich Richard Viktor, PhD (Freiburg), Associate Professor of Germanic Languages (1962, 1966).

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MARDIROS, Anthony Manuel, MA (Melbourne), MLitt (Cantab.), Professor of Philosophy (1946, 1957).

MARGOLIS, Robert Sydney, BA (Alberta), DDS (Alberta), Sessional Lecturer in Dentistry (1963, 1963).

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MARKLE, Alex Gilmour, BA MEd (Alberta), BJ (Carleton), Alumni Secretary (1951, 1951).

MARKS, Gerald Samuel, MSc (Cape Town), D. Phil (Oxon.), Associate Professor of Pharmacology (1962, 1964).

MARSDEN, David John, BSc (Alberta), DCAe (Cranfield), PhD (Toronto), Associate Professor of Mechanical Engineering (1965, 1965).

MARSHALL, Frederick C., BSc MD (Alberat), FRCS(C), Instructor in Surgery (1963, 1963).

MARSHALL, John David, BA (Queen's), BSc MSME (Purdue), Sessional Lecturer, Business Administration and Commerce (1965, 1967).

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MATHESON, Miss Jean Isabel, BA (Saskatchewan), LCSLT, Assistant Professor of Pathology, and Co-ordinator of Medical Laboratory Science (1956, 1965).

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MARXHEIMER, Edward, MA (California), Assistant Professor of French (1961, 1963).

MASAMUNE, Satoru, AB (Tohoku), PhD (California), Professor of Chemistry (1964, 1967).

MATAS, Matthew, MD (Alberta), Lecturer in Medicine (1951, 1957).

MATHIESON, James Ernest Leslie, DDS (Alberta), Sessional Lecturer in Dentistry (1961, 1961).

MAY, Edward Charles, BA (Trinity), MA PhD (Princeton), Associate Professor of Classics (1947, 1964).

McBURNEY, J. T., BCom (British Columbia), MEd (Alberta), Assistant Professor of Elementary Education (1967, 1967).

McCALLA, Arthur Gilbert, MSc (Alberta), PhD (California), FAIC, FRSC, Professor of Plant Biochemistry and Dean of Graduate Studies (1940, 1957).

McCALLA, Robert Irvine, BSc MD (Alberta), Sessional Instructor in Pharmacology, Lecturer in Anaesthesia (1957, 1965).

McCARTEN, Alan Brock, MD (Manitoba), FRCS (England), FRCS(C), Assistant Clinical Professor (1951, 1954).

McCAUGHEY, Gerald Sheldon, BA (McGill), MA (Washington), Associate Professor of English (1963, 1966).

McCLELLAND, Richard Charles, DDS (Alberta). Assocate Professor of Dentistry (1952, 1966).

McCLURE, Miss Ruth Elizabeth, BSc (Alberta), MPH (Pittsburgh), Professor and Director of the School of Nursing (1956, 1957).

McCONNELL, Flemming, BA (British Columbia), MD (Toronto), FRCP(C) Professor and Head of Radiology (1965, 1965).

McDONALD, John Merrill, BA (Saskatchewan), MSW (British Columbia), Assistant Professor of Extension (1967, 1967).

McDONALD, W. John, MSc (Saskatchewan), PhD (Ottawa), Assistant Professor of Physics (1965, 1965).

McELROY, Laird Ward, MSc (Alberta), PhD (California), Professor and Head of Animal Science (1943, 1951).

McFADDEN, Kenneth David, BA (Concordia, Minnesota), MA (State College, Iowa), PhD (North Dakota), Assistant Professor of Anatomy (1965, 1965).

McGIBBON, Evelyn Myrta, BSc (Alberta), Associate Director of Food Services (1966, 1966).

McGREGOR, John Ross, BSc MEd (Alberta), PhD (Cantab.), Professor and Head of Mathematics (1959, 1966).

McGREGOR, Ronald M., BEd (British Columbia), MED (Alberta), Assistant Professor of Elementary Education (1967, 1967).

McINTYRE, John William Ransome, MRCS LRCP DA FFARCS (England), Associate Professor of Anaesthesia and Sessional Instructor in Pharmacology (1960, 1967).

McKECHNIE, Douglas Craig, DDS (Alberta), Sessional Lecturer in Dentistry (1962, 1962).

McKENZIE, Alvin Hubert, BSc MD (Alberta), MCh Orth. (Liverpool), FRCS(C), Instructor in Orthopaedic Surgery (1960, 1961).

McKINNEY, Richard L., AB MA (Syracuse), PhD (Washington), Associate Professor of Mathematics (1962, 1967).

McLACHLAN, Merbert John, BSc (McGill), MSc (Washington), Associate Professor of Physical Education (1948, 1956).

McLEOD, Lionel Everitt, BSc MD (Alberta), MSc (McGill), FRCP(C), Professor of Medicine and Instructor in Biochemistry (1957, 1967).

McMASTER, Rowland Douglas, MA PhD (Toronto), Professor of English (1958, 1967).

McMILLAN, Mark L., MD ChB (Glasgow), Sessional Instructor in Community Medicine (1964, 1965).

McMINN, William Barton, BASc (Toronto), Director of Institutional Research and Systems (1962. 1968).

McMURCHY, Kenneth Allan, BA (Saskatchewan), DDS (Alberta), Professor and Head of Dental Science, Honorary Instructor in Anatomy (1948, 1961).

McNAMEE, John Joseph, BE BSc (Dublin), PhD (London), Professor of Mathematics 1958, 1963).

McPHAIL, William Grant, MD (Manitoba), Honorary Instructor in Community Medicine (1961, 1961).

McQUITTY, James Brian, BAgr (Queen's, Belfast), MS (Michigan State), Assistant Professor of Agricultural Engineering (1966, 1966).

McVEY, Wayne William, MA (Washington), Lecturer in Sociology (1966, 1966).

MEEKISON, John P., BASc (British olumbia), MA (Western Ontario), PhD (Duke), Assistant Professor of Political Science (1967, 1967).

MELAX, Hauker, BSc (Iceland), MSc (Alberta), Lecturer in Anatomy (1967, 1967).

MEILICKE, Carl Alexander, BCom (Saskatchewan), Assistant Professor of Sociology and Community Medicine (1966, 1966).

MEIR, Amram, MSc PhD (Hebrew University, Jerusalem), Associate Professor of Mathematics (1963, 1965).

MELOFF, William Alan, MA (Alberta), Assistant Professor of Sociology (1966, 1966).

MELTZER, Herbert, MD (Manitoba), Instructor in Surgery (1946, 1946).

MELVIN, Robert Andrew, BA (Brandon College), Assistant Professor of Political Science (1966, 1966).

MENDRYK, Stephen, BEd (Alberta), MS (California), Associate Professor of Physical Education (1955, 1961).

METCALFE, James Overgard, BSc MD (Alberta), FRCS(C), Clinical Professor of Surgery (1952, 1958).

MEYER, Walter Karl, DDS (Alberta), Assistant Professor of Dentistry (1963, 1967).

MEYERS, Albert, MS (City College, N.Y.), Associate Professor of Industrial and Vocational Education (1965, 1967).

MICHALYSHYN, Bohdan, MD (Alberta), Clinical Professor of Surgery (1951, 1957).

MIDDLEDITCH, Robert James, BA (Manitoba), Secretary to Faculty of Arts (1965, 1965).

MIELKE, Bruce Walter, BSc MD (Alberta), Associate Professor of Pathology (1960, 1967).

MIELKE, Miss Frances Sara, BA (Manitoba), BLS (Toronto), Librarian (1961, 1961).

MIKLOS, Erwin, BA BEd (Saskatchewan), MEd PhD (Alberta), Professor of Educational Foundations (1962, 1967).

MILLER, Jack David Raoul, BSc MB BCh (Witwatersrand), Instructor in Radiology (1964, 1964).

MILLER, Melvin Joseph, BSc MD (Alberta), Honorary Sessional Instructor in Social and Preventive Medicine (1964, 1964).

MILLIGAN, Larry Patrick, MSc (Alberta), PhD (California), Assistant Professor of Animal Science (1966, 1966).

MILLS, Kenneth I., BA (London), BPhil (Oxon.), Assistant Professor of Philosophy (1966, 1966).

MITCHELL, Marvin, BSc MD (Alberta), FAAP, Instructor in Paediatrics (1964, 1965).

MOHSEN, Ahmad Sami Abdel, BA (Ain Shams, Cairo), MA (Michigan), Assistant Professor of Sociology (1967, 1967).

MOIR, Arnold Fraser, BA BL (Alberta), ML (Harvard), Sessional Instructor in Law (1948, 1948).

MONCKTON, George, MB BS MD MRCP (London), FRCP(C), Associate Professor of Medicine (1957, 1958).

MONOD, Mme. Madeleine Jacqueline, L ès Sciences Sociales (Geneva), BEd (Alberta), Assistant Professor of Secondary Educatoin (1963, 1963).

MONOD, Pierre Alfred Roland, LicScEcon (Geneva), BEd MEd (Alberta), Assistant Professor of Romance Languages (1964, 1966).

MONTGOMERY, Charles Cliff, BCom (British Columbia), Assistant Professor of Business Administration and Commerce (1967, 1967).

MOON, John Wesley, BA (Bethany), MA (Michigan State), PhD (Alberta), Associate Professor of Mathematics (1964, 1966).

MOONIE, George T., BA (Saskatchewan), MD (Alberta), Lecturer in Anaesthesia (1954, 1954).

MOORE, Charles Herald, BA (Western Ontario), DU (Paris), Professor of French (1954, 1966).

MOORE, Jeremy, BA (Dunelm.), Assistant Professor of Art (1967, 1967).

MORAVCIK, Ivo, BA (Ohio), MA PhD (Indiana), Associate Professor of Economics (1960, 1963).

MOREAU, Joseph Paul, BA (Laval), MD (Alberta), FRCS(C), Lecturer in Surgery (1950, 1958).

MORGAN, Lynn Parkes, BA (McMaster) Associate Registrar (1956, 1964).

MORGANTE, Miss Odosca, BA (Udine, Italy), MD (Rome), MSc PhD (McGill), Associate Professor of Bacteriology (1962, 1967).

MORTON, Roger David, BSc PhD (Nottingham), Associate Professor of Geology (1967, 1967).

MORTON, Guy Kent, MD (Alberta), Clinical Professor in Surgery (1947, 1956).

MOSER, Leo, BSc (Manitoba), MA (Toronto), PhD (N. Carolina), FRSC, Professor of Mathematics (1951, 1960).

MOSKALYK, Richard Edward, MSc (Saskatchewan), PhD (Alberta), Assistant Profesor of Pharmacy (1963, 1963).

MOTUT, Roger George, BA (Laval), BEd MA (Alberta), Associate Professor of French and Assistant Dean of Arts (1958, 1964).

MOTYL, Mrs. Barbara Jean, BSc (Carleton), Instructor in Clinical Pathology (1956, 1960).

MOWAT, Gordon Leslie, BSc (Brigham Young), MA EdD (Stanford), Professor of Educational Administration (1957, 1959).

MOYER, Donald John, MD (Western Ontario), FACOG, Instructor in Obstetrics and Gynaecology (1958, 1964).

MUIR, James Douglas, MCom (British Columbia), MBA (California), Assistant Professor of Business Administration and Commerce (1964, 1964).

MULLEN, Ronald Perry, BA (Saskatchewan), DDS (Alberta), MSD (Northwestern), Assistant Professor of Dentistry (1958, 1959).

MULLIN, Miss Rosemary Louise, BA (Mt. Mercey College), MA PhD (Washington), Assistant Professor of Classics (1966, 1967).

MULLOY, Joseph Edward, BA BCom (Dublin), CA, Associate Professor in Extension (1962, 1967).

MUNN, Miss Alexandra Marguerite, AMus (Alberta), LRSM Dip (Juilliard School), Assistant Professor of Music (1962, 1965).

MUNRO, Miss Katherine Lois, BA, BLS (British Columbia), Librarian (1966, 1966).

MUNRO, Stanley Robert, MA (Hawaii), Assistant Dean of Men, Assistant Foreign Student Adviser, Instructor in English (1966, 1966).

MURDESHWAR, Mangesh Ganesh, MA (Bombay), PhD (Alberta), Assistant Professor of Mathematics (1964, 1964).

MURPHY, Gerald, BEd (Alberta), MEd (Oregon), Associate Professor of Secondary Education (1967, 1967).

MURRAY, David William, BSc (Alberta), MSc DIC (London), Associate Professor of Civil Engineering (1960, 1961).

MUSACCHIO, Mrs. Daniele, L ès L, Dip d'Et Sup (Lyons), Assistant Professor of Romance Languages (1962, 1964).

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MUTTITT, Eldon Leonard Carswell, BA (Saskatchewan), MD (Manitoba), Instructor in Clinical Medicine (1964, 1964).

MYERS, Gordon Edward, MSc (Alberta), PhD (McGill), Professor of Pharmacy )1947, 1966).

NADER, Walter, MSc (Texas), PPhil (Vienna), Associate Professor of Chemical and Petroleum Engineering (1960, 1963).

NAIMPALLY, Somasshekhar Amrith, MSc (Bombay), PhD (Michigan State), Associate Professor of Mathematics (1965, 1968).

NAKONECHNY, Mrs. Geraldine M., BSc (Alberta), Lecturer in Nursing (1967, 1968).

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NASH, Charles William, BSc (Manitoba), MSc PhD (Minnesota), Professor of Pharmacology (1954, 1957).

NAY, Marshall Alexander, MSc BEd PhD (Alberta), Associate Professor of Secondary Education (1960, 1963).

NEAL, Walter Douglas, BSc BA MEd (W. Australia), EdD (Columbia), Professor of Educational Administration, Associate Dean (1963, 1967).

NEILSON, Gordon Croyden, MA PhD (British Columbia), Professor of Physics (1959, 1966).

NEILSON, Mrs. Rosemary L., BA (Mt. Mercy College), MA PhD (Washington), Assistant Professor of Classics (1966, 1967).

NELSON, James Malcolm, BA (W. Ontario), MA (Toronto), Assistant Professor of English (1962, 1963).

NELSON, Mrs. Jean Clyne, MB ChB (Aberdeen), DCH (London), MRCP (Edinburgh), Lecturer in Paediatrics (1955, 1966).

NELSON, Joseph S., BSc (British Columbia), MSc (Alberta), Assistant Professor of Zoology (1968, 1968).

NELSON, Leonard Doyal, MEd (Alberta), PhD (Minnesota), Professor of Elementary Education (1959, 1966).

NELSON, Thomas Morgan, MA PhD (Michigan State), Professor and Head of Psychology (1964, 1967).

NELSON, Thomas Robert, MB ChB (Edinburgh), MRCOG (London), FRCS(C), Associate Clinical Professor in Obstetrics and Gynaecology (1957, 1963).

NETTLER, Gwynn, AB (UCLA), MA (Claremont), PhD (Stanford), Professor of Sociology (1963, 1966).

NEUFELD, Kenneth Allen, BEd BA (Saskatchewan), MS PhD (Wisconsin), Assistant Professor of Elementary Education (1967, 1967).

NEWBOUND, Kenneth Bateman, MSc (Manitoba), PhD (Massachusetts I.T.), Professor and Associate Dean of Science (1948, 1964).

NIX, Nelson William, BSc MD (Alberta), FACA, Assistant Clinical Professor of Anaesthesia (1955, 1965).

NODEN, Denys, MA (Cantab.), BLS (McGill), Assistant Librarian, Technical Services (1952, 1967).

NOORZOY, M. Siddieq, MA (California), PhD (Washington), Assistant Professor of Economics (1965, 1966).

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NOVAKSHONOFF, William Russell, BA BEd (Saskatchewan), MA (Alberta), Assistant Professor of Slavonic Languages (196, 1967).

NUNN, Charles Christopher, BA (Oxon.), MSc (London), Assistant Professor of Economics (1965, 1967).

NURSALL, John Ralph, MA (Saskatchewan), PhD (Wisconsin), Professor and Head of Zoology (1953, 1964).

NURSALL, Mrs. Mary, BA (Toronto), MA (Saskatchewan), Lecturer in Physiology (1954, 1964).

NUTTALL, John Blakely, MASc (British Columbia), DIC (London), Associate Professor of Civil Engineering (1961, 1963).

NYBERG, Verner Richard, BSc MED (Alberta), EdD (California), Associate Professor of Educational Psychology (1966, 1966).

NYBORG, Marvin Peter K., BSc, MSc (Saskatchewan), PhD (McGill), Assistant Professor of Soil Science (1968, 1968).

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OFFENBERGER, Allan Anthony, MASc (British Columbia), PhD (MIT), Assistant Professor of Electrical Engineering (1968, 1968).

OGLES, Richard H., BS (Utah), MS (Brigham Young), PhD (Washington State), Associate Professor of Sociology (1968, 1968).

OGUZTORELI, Mahmet Namik, BSc PhD (Istanbul), Professor of Mathematics (1967, 1967).

OHASHI, Mrs. Bonnie Aiko, BSc (Alberta), Instructor in Pathology (1966, 1967).

OLSEN, Clare Whillans, BA (Saskatchewan), DDS (Alberta), Sessional Lecturer in Dentistry (1962, 1964).

OLSEN, William Charles, MASc (British Columbia), PhD (Alberta), Associate Professor of Physics (1964, 1968).

OLSON, Eugene George, BA (Saskatchewan), BLS (McGill), Librarian (1964, 1964).

ORFORD-SMITH, Edward Stuart, MA MB BChir (Cantab.), DPH (London), MRCS (England), Assistant Clinical Professor of Community Medicine (1955, 1964).

ORRELL, John Overton, MA PhD (Toronto), MA (Oxon.), Associate Professor of English (1961, 1968).

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PAAP, Mrs. Thea, BA BLS (British Columbia), Librarian (1965, 1965).

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PACKER, John George, BSc (London), Associate Professor of Botany (1958, 1965).

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PADHYE, Aravind Anant, MSc PhD (Poona), Lecturer in Bacteriology (1968, 1968).

PADSHA, Syed Mahmood, MB BS (Karachi), PhD (London), Associate Professor of Physiology (1965, 1968).

PAI, Chik Hyun, MD (Seoul), PhD (Cincinnati), Assistant Professor of Microbiology (1966, 1966).

PALMER, Mrs. Helen F., BA, BLS (McGill), Librarian (1967, 1967).

PANNU, Gurdial Singh, BLS, MLS (Toronto), BA (Panjab), Associate Professor, School of Library Science (1968, 1968).

PAPROSKI, Kenneth R. H., BSc MD (Alberta), Sessional Instructor in Community Medicine (1964, 1965).

PARANCHYCH, William, MSc (Alberta), PhD (McGill), Associate Professor of Biochemistry (1963, 1967).

PARANJAPE, Bhalachandra Vishwanath, MSc (Nagpur), PhD (Liverpool), Associate Professor of Physics (1961, 1964).

PARKER, Douglas Vernon, BA (Manitoba), MA (Washington), Associate Professor of Secondary Education (1966, 1968).

PARKER, James, MA (Alberta), University Archivist (1968, 1968).

PARKER, William Ronald, LRCSE, LRFPSG (Glasgow), DMRD (Anderson's College), Instructor in Radiology (1963, 1963).

PARKER-JERVIS, Noel John, BA (British Columbia), Assistant Professor of English (1962, 1966).

PARLEE, Stephen Sackville, BSc MD (Alberta), FACS, DABOG FRCOG, Associate Clinical Professor of Obstetrics and Gynaecology (1947, 1967).

PARRY, Thomas Alan, MA, BD (Alberta), Counsellor, Student Counselling (1968, 1968).

PASCOE, Joseph Herbert, BA MD Diploma in Psychiatry (Toronto), FRCP(C), Instructor in Psychiatry (1959, 1960).

PATCHING, Thomas Herbert, BSc (Alberta), Professor of Mining and Metallurgy (1947, 1958).

PATEL, Nagin K., BPharm (Gujarat), MS (Temple), PhD (Maryland), Associate Professor of Pharmacy (1966, 1967).

PATERSON, Alan Robb Phillips, MA PhD (British Columbia), Professor of Biochemistry and Director of McEachern Laboratory (1962, 1962).

PATERSON, Ian Wilson, BA (Sydney), DPhil (Alberta), Lecturer in Secondary Education and Student Teaching (1967, 1967).

PATERSON, John Gilbert, BEd BA (Alberta), MA (Stanford), EdD (Washington), Associate Professor of Educational Psychology (1968, 1968).

PATON, David Murray, MB ChB (Cape Town), Assistant Professor of Pharmacology (1966, 1966).

PATRICK, Andrew, MB ChB (Glasgow), FRCS(C), Sessional Instructor in Surgery (1964, 1964).

PATTERSON, Robert Steven, MEd (Alberta), PhD (Michigan State), Associate Professor of Educational Foundations (1966, 1967).

PAWLIUK, Z. Michael, DDS (Alberta), MS (Northwestern), Assistant Professor of Dentistry (1962, 1966).

PAWLUK, Steven, MSc (Alberta), PhD (Minnesota), Associate Professor of Soil Science (1959, 1963).

PAWLUK, William, BSc MD (Alberta), Instructor in Surgery (1964, 1965).

PEACOCK, Gordon Bruce, BEd (Alberta), MFA (Carnegie), Professor and Head of Drama (1953, 1965).

PEACOCKE, Charles Thomas, BEd BA (Alberta,) (MFA (Carnegie), Associate Professor of Drama (1961, 1967).

PEARSON, William Wallace, BA (Rutgers), MA (New Jersey), PhD (New York), Associate Professor of Industrial and Vocational Education (1966, 1966).

PEDDICORD, Richard, MA, PhD (California), Assistant Professor of Computing Science (1968, 1968).

PEDDLE, Garry John Douglas, BS (Harding College), MA PhD (Toronto), Assistant Professor of Chemistry (1964, 1964).

PEEL, Bruce Braden, MA (Saskatchewan), BLS (Toronto), Librarian to the University (1951, 1956).

PENDERGAST, Reverend Russell Anthony Joseph, MA (Toronto), PhD (Ottawa), Assistant Professor of Economics (1963, 1965).

PENNY, Cherer Garnet, MB BCh (Witwatersrand), Instructor in Community Medicine (1964, 1966).

PENNY, John Philip, MSc, PhD (Adelaide), Associate Professor of Computing Science (1967, 1967).

PERCY, John S., MB, BS, (Dunelm.), MRCP (Edinburgh, London), MD (Newcastle), Assistant Professor of Medicine (1968, 1968).

PERRONI, Amedeo Francesco Guilio Giuseppe, BA MBA (Toronto), Associate Professor of Business Administration and Commerce (1962, 1968).

PERT, Geoffrey, John, BSc, PhD DIC (Imperial College, University of London), Assistant Professor of Electrical Engineering (1967, 1968).

PETERSEN, Thomas Alfred, BSc (Alberta), MA (Washington State), Associate Professor of Agricultural Engineering (1963, 1967).

PETERSON, Alan Wallace, MSc (Alberta), Associate Professor of Civil Engineering (1953, 1959).

PETERSON, Frank Lowell, DDS (Alberta), Lecturer in Dentistry (1963, 1965).

PEATRUK, Milton William, BSc (Alberta), Assistant Professor of Industrial and Vocational Education (1965, 1967).

PHAN, Chon-Ton, BSc (Lycée Buffon), MSc (Laboratoire de Biologie Végétale, Meudon), DSc (Paris), Assistant Professor of Plant Science (1968, 1968).

PHIBBS, Edgar, MA (Cantab.), Associate Professor of Mathematics (1947, 1952).

PHILLIPS, David Lloyd Carrick, MD (Alberta), Instructor in Psychiatry (1955, 1955).

PHILLIPS, Ronald Edward, BSc (Alberta), Associate Professor of Electrical Engineering and Director, Physical Plant (1942, 1963).

PHILLIPS, William Emerson, B.Sc (McGill), M.S. (Connecticut), PhD (California), Assistant Professor (1968, 1968).

PICKLES, Barrie, MCSP (Leeds School of Physiotherapy), Lecturer in Rehabilitation Medicine (1967, 1967).

PIECHOWSKI, Michael, MSc (Adam Mickiewicz, PhD (Wisconsin), Assistant Professor of Microbiology (1967, 1967).

PIERCE, Miss Helen L., MEd (Alberta), Assistant Professor of Educational Foundations (1967, 1968).

PIKE, Robert Marden, MSc (London School of Economics), PhD (Australian National University), Assistant Professor of Sociology (1965, 1965).

PILKINGTON, Wilfred, MA BEd (Alberta), Professor and Associate Dean, Student Programs and Records, Faculty of Education (1952, 1967).

PINNINGTON, Eric Henry, BSc PhD (London), ARCS DIC (London), Assistant Professor of Physics (1965, 1965).

PINOLA, Rudolph, BA MS PhD (Wisconsin), Associate Professor of Business Administration and Commerce (1964, 1964).

PISESKY, Walter, BSc MD (Alberta), FRCS(C), Lecturer in Surgery (1961, 1967).

PLAMBECK, James Alan, BA (Carleton, Minnesota), MS PhD (Illinois), Assistant Professor of Chemistry (1965, 1965).

PLITT, Loverne Rubin, MSc (Alberta), Assistant Professor of Mining and Metallurgy (1966, 1966).

PLUTH, Donald J., MS, PhD (Minnesota), Assistant Professor of Soil Science, (1967, 1968).

POCKLINGTON, Thomas Carey, BA (Toronto), PhD (Indiana), Associate Professor of Political Science (1961, 1967).

POIRIER, Richard Anthony, BA MD (Montreal), Lecturer in Paediatrics (1948, 1956).

POLK, James Raymond, BA (Montana), MA (Harvard), Assistant Professor of English, (1968, 1968).

POLO, José Polo, LicFil DrFil (Granada), Assistant Professor of Romance Languages (1966, 1966).

POMAHAC, Mrs. Gertrude C., BA (Alberta), MLS (Washington), Librarian, School of Library Science (1968, 1968).

POOLE, Melvin George, BCom (Alberta), Assistant to the Vice-President for Finance and Administration, (1968, 1968).

POUNDER, James Rudsdale, MA (Toronto), PhD (Dublin), Associate Professor of Mathematics (1955, 1962).

POURBAIX, William Eugene, BA (Saskatchewan), MD (Alberta), Honorary Instructor in Medicine (1961, 1961).

POWRIE, Thomas Lawrence, BSA MA (Saskatchewan), DPhil (Oxon.), Associate Professor of Economics (1959, 1964).

PRASAD, Kailash, BSc (Patna), MBBS (Bihar), MD (Delhi), PhD (Alberta), Assistant Professor of Pharmacology (1967, 1968).

PREITZ, Clarence Harold, BSc (Millersville State College), MSc (Pennsylvania), Associate Professor of Industrial and Vocational Education (1955, 1968).

PRESTON, Thomas Alexander, MA (Cantab.), Associate Professor of Agricultural Engineering (1963, 1963).

PRESTON, William Walford, BSc (Queen's), Associate Professor of Civil Engineering (1938, 1950).

PRICE, George Henry, BA BD MA (Wales), Associate Professor of Philosophy (1964, 1966).

PRIDEAUX, Gary Dean, BA (Rice), PhD (Texas), Assistant Professor of Germanic Languages and Linguistics (1966, 1966).

PRIDMORE, Peter, BA (Dunelm.), Assistant Cataloguer (1967, 1967).

PROUDFOOT, Vincent Bruce, PhD (Queen's, Belfast), Associate Professor of Geography (1967, 1967).

PUGH, David R. P., MA (Wales), MEd (Nottingham), Associate Professor of Educational Foundations (1967, 1967).

PURCELL, Miss M. Geneva, BN (McGill), MSc (Boston), Assistant Professor, School of Nursing (1966, 1966).

PURVIS, Neil MacLean, BSc MEd (Alberta), Associate Professor and Acting Head of Elementary Education (1964, 1967).

QUEHL, Eby, MD (Alberta), MRCOG (London), Lecturer in Obstetrics and Gynaecology (1950, 1955).

QUINLAN, Peter Thomas, BSc MB ChB (Manchester), FRCS (Edinburgh), Lecturer in Surgery (1960, 1964).

QUON, Donald, MSc (Alberta), ScD (Massachusetts I.T.), Professor of Chemical and Petroleum Engineering (1949, 1964).

QURESHI, Ahmad Hasan, MA (Punjab), BS MA PhD (Illinois), Assistant Professor of English (1961, 1961).

QURESHI, Saleem M. M., MA (Agra), LLB (Lucknow), PhD (Pennsylvania), Associate Professor of Political Science (1963, 1965).

RACZ, Mrs. Darilyn Ann, BSc (Alberta), Instructor in Pathology (1966, 1966).

RAJARATNAM, Nallamuthu, BE, MSc (Madras), PhD (Indian Institute of Science, Bangalore), Associate Professor of Civil Engineering (1965, 1967).

RALETICH, Mrs. Ivana, Diploma in English and French (Belgrade), BLS (Toronto), Librarian (1960, 1960).

RAMSEY, Colin George, BSc (New Brunswick), MD CM (McGill) Clinical Lecturer in Medicine (1958, 1967).

RANKIN, David, MA (British Columbia), PhD (Alberta), Associate Professor of Physics (1964, 1967).

RAPIER, Dunbar Outten Cecil, BA (McGill), MB ChB (Edinburgh), Assistant Professor of Psychiatry (1964, 1966).

RATSOY, Eugene William, BSc BEd PhD (Alberta), Associate Professor of Educational Administration (1964, 1967).

RAZAVY, Mohsen Modarres, MA (Tehran), PhD (Louisiana State), Associate Professor of Physics (1963, 1966).

RAZZELL, Wilfred Edwin, BA (British Columbia), PhD (Illinois), Professor and Head of Microbiology (1966, 1966).

READ, Frederick Douglas, BSc DDS (Alberta), Associate Professor in Dentistry (1959, 1968).
READ, Mrs. Lorna, BPE (Alberta), Instructor of Physical Education (1966, 1966).
RECKORD, Mrs. Mary, MA (Manchester), PhD (London), Assistant Professor of History (1965, 1965).
REDFORD, John, BA (British Columbia), MD (Toronto), Professor and Director of Rehabilitation Medicine, Professor of Community Medicine, (1967, 1968).
REED, Miss Sarah Rebecca, AB (Cornell), BLS MA (Illinois), Director of the School of Library Science (1967, 1968).
REES, Donald Leslie, BSc MD (Alberta), Clinical Instructor in Surgery (1960, 1967).
REESE, Willard Francis, BS (U.S. Merchant Marine Academy), MA (Colorado State), Associate Professor of Elementary Education (1960, 1963).
REHRIG, Miss Geraldine, AB (Bryn Mawr), MFA (Yale), Assistant Professor of Drama (1966, 1967).
REID, David C., Dip (Toronto), Lecturer in Rehabilitation Medicine (1968, 1968).
REID, David William James, BSc MD (Alberta), FRCS(C), FACOG(JF), Assistant Clinical Professor of Obstetrics and Gynaecology (1961, 1967).
REIFFENSTEIN, Rhoderic John, BSc (McGill), PhD (Manitoba), Assistant Professor of Pharmacology (1964, 1964).
REINELT, Erhard Rudolph, BSc PhD (Alberta), MA (Toronto), Associate Professor of Geography 1965, 1968).
REINHOLD, Ernest, BSc MA (Alberta), PhD (Michigan), Professor and Head of Germanic Languages and Linguistics (1952, 1965).
REMPEL, Peter P., BA BEd (Saskatchewan), PhD (Minnesota), Associate Professor of Psychology and Senior Counsellor of Student Counselling Services (1959, 1964).
RENNER, Miss Ruth Olive Ann, MSc (Alberta), PhD (Cornell), Associate Professor of Household Economics (1960, 1963).
RENTIERS, Paul Louis, BA MD (Alberta), MSc MD (Minnesota State), Assistant Clinical Professor of Dermatology (1954, 1954).
RESCHENTHALER, Gilbert Brown, BA (Texas Western), MA (Texas), Associate Professor of Business Administration and Commerce (1967, 1968).
REVELL, Miss Grace Aileen, RN (Alberta), Infirmary Nurse (1935, 1935).
REYNOLDS, James Farin, AB (Bowdoin College), Assistant Professor of Political Science 1968, 1968).
RHEMTULIA, Akbar H., BSc (London), PhD (Cantab.), Assistant Professor of Mathematics (1967, 1968).
RICHARD, Harold Lane, MD (Alberta), FRCS(C), FACS, Assistant Clinical Professor in Surgery (1939, 1962).
RICHARDS, Hugh Morgan, MB (London), BS, DPH (London), Research Associate in Bacteriology (1968, 1968).
RICHARDSON, Miss Mary Helen, BSc (McGill), MEd (Alberta), Assistant to the Dean of Women (1965, 1965).
RICHMOND, Miss Patricia, MA PhD (California), Assistant Professor of Sociology (1967, 1967).
RIDDLE, William John, BSc MD (Alberta), Instructor in Community Medicine (1966, 1966).
RIGAL, Wynne Milton, MB, ChB (Cape Town), PhD (Oxon.), FRCS (Edinburgh), Associate Professor of Surgery (1968, 1968).
RITCHIE, Douglas Campbell, BSc MD (Ablerta), FACS, Associate Clinical Professor of Obstetrics and Gynaecology (1949, 1966).
ROBARTS, Alvin Orel, BS (California), MS (San Francisco), Assistant Professor of Business Administration and Commerce (1966, 1968).
ROBBERECHT, Paul Albert, BA (McMaster), MA (Dalhousie), Assistant Professor of Romance Languages (1964, 1965).
ROBBINS, Stuart George, Dip Phys Ed (St. Luke's, Exeter), Assistant Professor of Physical Education (1964, 1967).
ROBBLEE, Alexander Robinson, MSc (Alberta), PhD (Wisconsin), Professor of Poultry Nutrition (1945, 1957).
ROBERTS, Hayden Wayne, MA (Cape Town), Associate Professor of Extension (1967, 1967).
ROBERTSON, James Alexander, BSA MSc (Manitoba), PhD (Purdue), Associate Profesor of Soil Science (1955, 1964).
ROBERTSON, Miss Jean Elizabeth, BSc MEd (Alberta), Associate Professor of Elementary Education (1965, 1967).
ROBINSON, Donald Baker, MASc (British Columbia), PhD (Michigan), FCIC, Professor and Head of Chemical and Petroleum Engineering (1948, 1959).
RODKIEWICZ, Czslae Mateusz, DipIng (Polish University College), MS (Illinois), Associate Professor of Mechanical Engineering (1958, 1964).
RODMAN, Floyd Silas Beverly, MSc (Saskatchewan), PhD (Minnesota), MD (Alberta), Assistant Clinical Professor of Medicine (1948, 1955).
ROGERS, Thomas deForth, BS (Emory), PhD (California), Assistant Professor in Mathematics (1967, 1968).
ROGERS, Walter Bob, BSc (Texas Technical College), MSc (Arizona), PhD (Oklahoma State), Assistant Head of Agricultural Economics (1965, 1967).
ROLLINS, Bryce, BCom (Alberta), CA, Associate Professor of Business Administration and Commerce (1961, 1967).
ROLSTON, Thomas, LRCM (London), Associate Professor and Acting Head of Music (1958, 1967).
ROONEY, Mrs. Sieglinde Emile Hanna, BA (Saskatchewan), BLS (Toronto), Librarian (1965, 1965).
ROSE, Edward Joseph, AM (Brooklyn College), PhD (Toronto), Professor of English (1958, 1968).
ROSE, Patrick Blair, MD (Alberta), Honorary Instructor in Community Medicine (1961, 1967).
ROSE, Mrs. Shirley, MA (Brooklyn College, PhD (London), Assistant Professor of English (1967, 1967).
ROSEN, Lawrence Sydney, MBA (Washington), BCom (British Columbia), CA, Associate Professor of Business Administration and Commerce (1966, 1966).
ROSS, Colin Andrew, MD (Alberta), FRCS(C), Lecturer in Clinical Surgery (1954, 1955).
ROSS, Donald Murray, MA (Dalhousie), PhD ScD (Cantab.), FRSC, Professor of Zoology and Dean of the Faculty of Science (1961, 1961).
ROSS, Morton Lee, BA (Cornell), MA, PhD, (Iowa), Associate Professor of English (1968, 1968).
ROSSALL, Richard Edward, BSc MB ChB MD (Leeds), MRCP FRCP(C), Associate Professor of Medicine (1957, 1966).
ROSTOKER, Gordon, BSc (Toronto), MA (Toronto), PhD (U.B.C.), Assistant Professor in Physics (1968, 1968).
ROSTRUP, Olav, MD (Alberta), FACS FRCS(C), Clinical Professor of Orthopaedic Surgery (1939, 1957).
ROTHROCK, George Abel, BA (Delaware), MA PhD (Minnesota), Associate Professor of History (1964, 1964).
ROUSELL, Murray Alexander, BCom (McGill), CA, Comptroller (1946, 1968).
ROUTLEDGE, Robert H., BEd, MEd (Alberta), Associate Professor of Physical Education (1967, 1967).
ROWAND, Miss Elizabeth Frances, OTR (Toronto), Lecturer in Physical and Occupational Therapy (1961, 1961).
ROXBURGH, Peter A., MB (Birmingham), GPM (London), Assistant Professor of Psychiatry (1967, 1968).
ROY, Gerald, BSc (W. Ontario), PhD (Florida State), Assistant Professor of Physics (1965, 1965).
ROYCE, Joseph Russell, AB (Denison), PhD (Chicago), Professor of Psychology and Director, Centre for Advanced Study in Theoretical Psychology (1960, 1967).
ROZEBOOM, William Warren, BS PhD (Chicago), Professor of Psychology (1964, 1968).
RULE, Mrs. Brendan Gail, MA (California), PhD (Washington) Associate Professor of Psychology and Educational Administration (1963, 1968).

RULE, Stanley Jay, BA (Redlands), MA PhD (Washington), Associate Professor of Psychology (1962, 1967).

RUNQUIST, Willard Nelson, AB (Redlands), MA PhD (Northwestern), Professor of Psychology (1962, 1967).

RUSSELL, James Christopher, BSc, (Dalhousie), MASc, PhD, (Saskatchewan), Assistant Professor of Surgery (1967, 1967).

RUSSELL, Miss Phyllis Jeannine, BA (Alberta), BLS (Toronto), Medical Librarian (1950, 1957).

RUTH, Royal Francis, AB (Grinnell), MSc PhD (Wisconsin), Associate Professor of Zoology (1961, 1964).

RYAN, Aylmer Arthur, MA (Alberta), Professor of English, Provost, Executive Assistant to the President (1940, 1962).

RYAN, James Thomas, MSc (Missouri), Associate Professor of Chemical Engineering (1965, 1968).

RYAN, John Martin, BSc (St. Francis Xavier), MD CM (Dalhousie), Assistant Clinical Professor in Medicine (1958, 1967).

SABATINI, Mrs. Mary Heiber, BA (Brooklyn), MA (Columbia), Assistant Professor, in Romance Languages (1968, 1968).

SADLER, Gerald Wesley, BSc (Saskatchewan), MSc (Illinois), Associate Professor of Mechanical Engineering (1947, 1956).

SAGER, Mrs. Lorna Jane, BA (British Columbia), Education Librarian (1967, 1967).

SALMON, Peter Alexander, MS PhD (Minnesota), MD (Washington), Associate Professor of Surgery (1966, 1966).

SALT, Walter Raymond, MSc (Alberta), Professor of Anatomy (1949, 1958).

SALYZYN, Vladmir, MA (Alberta), BCom (Saskatchewan), PhD (Illinois), Assistant Professor of Economics (1965, 1965).

SAMPLE, John Thomas, MA PhD (British Columbia), Professor and Chairman, Department of Physics (1958, 1967).

SAMPSON, Jeffrey Robert, AB (Northwestern), AM, PhD, (Michigan), Assistant Professor of Computing Science (1968, 1968).

SAMPSON, William R., BA (St. Olaf's College, Minnesota), MA (Wisconsin), Assistant Professor of History (1967, 1967).

SAMUEL, Mrs. Helen Viola, BHEc (Alberta), MA (Michigan State), Associate Professor of Household Economics (1960, 1965).

SAMUEL, George, MA (Glasgow), Associate Professor of French, Administrator of Professional Exams (1948, 1956).

SAMUEL, George, MA (Alberta), Assistant Professor of English (1963, 1965).

SAMUELS, Harold Louis, BSc DDS (Alberta), Assistant Professor of Operative Dentistry (1948, 1952).

SAMUELS, Joseph William, BA LLB (Queen's), LLM (London), Assistant Professor of Law (1967, 1967).

SANDE, David J., BPE (Alberta), Lecturer of Physical Education (1967, 1968).

SANDERS, James, BA (Toronto), MA (Queen's), PhD (Syracuse), Associate Professor of Mathematics (1963, 1963).

SANDERS, Mrs. Patricia Margaret, BSc PhD (London), Assistant Professor of Pharmacology (1965, 1966).

SANDILANDS, Mrs. Marjorie, BSc (Alberta), Lecturer in Nursing (1968, 1968).

SANG, Emmanuel, BSc (Dunelm.), MASc (British Columbia), DPhil (Oxon.), Assistant Professor of Electrical Engineering (1967, 1967).

SAPKOS, Stanley William P., DDS (Alberta), Sessional Lecturer in Dentistry (1965, 1965).

SARTORIS, Paul Charles, MA (Alberta), PhD (Utah), Associate Professor of Educational Psychology, and Counsellor, Student Counselling (1966, 1966).

SASKONKIN, Manus, MMus (Yale), PhD (Boston), Associate Professor of Music (1966, 1966).

SAVIC, Edward Ivor, BA (Carleton), BLS (Ottawa), Librarian, Extension Library (1967, 1967).

SAWADA, Daiyo, MEd (Alberta), Assistant Professor of Elementary Education and Division of Educational Research (1967, 1967).

SCHAARSCHMIDT, Gunter Herbert, MA (Alberta), Assistant Professor of Slavonic Languages (1963, 1965).

SCHACHTER, Melville, MSc MD CM (McGill), Professor and Head of Department of Physiology (1965, 1965).

SCHAEFER, Otto, MD (Heidelberg), Instructor in Clinical Medicine (1965, 1965).

SCHAEFER, Mrs. Barbara Heckman, BA (Douglass College), MS PhD (Rutgers), Assistant Professor of Psychology (1966, 1966).

SCHAEFFER, Dirk L., BA (Rutgers), MA (Temple), Assistant Professor of Psychology (1966, 1966).

SCHIFF, Harry, MSc PhD (McGill), Professor of Physics (1953, 1964).

SCHMIDT, Wilfred H. O., BA (S. Africa), DrPhil (Leipzig), Professor of Educational Psychology (1966, 1966).

SCHNECK, Rodney Edward, BS BA MBA (Denver), DBA (Washington), Associate Professor of Business Administration and Commerce (1966, 1966).

SCHONBAUM, Gregory Richard, BSc PhD (London), Associate Professor of Biochemistry (1962, 1964).

SCHOULS, Peter A., AB (Illinois), MA PhD (Toronto), Assistant Professor of Philosophy (1967, 1967).

SCHRAG, Astor Ralph, MD (Alberta), Associate Clinical Professor of Psychiatry (1945, 1966).

SCHULTZ, Wolfgang Martin, DiplomLanwert Dr Landwirtschaft (Justus Liebig), PhD (Oklahoma State), Associate Professor of Agricultural Economics (1964, 1966).

SCHWARZ, Harald Alfred Johann, MD (Alberta), Honorary Sessional Instructor in Community Medicine (1964, 1964).

SCHWARTZ, Bernard, BA (Brooklyn), MS (Pratt Institute), DEd (Pennsylvania State), Associate Professor of Elementary Education (1965, 1967).

SCOTT, Miss Alison Pettigrew, MA BLitt (Oxon.), PhD (Queen's), Associate Professor of Germanic Languages and Linguistics (1959, 1964).

SCOTT, Donald Burton, BA (Toronto), PhD (McGill), Professor and Head of Computing Science and Director of the Computing Centre (1940, 1968).

SCOTT, Flora Halina, BSc, MD (Alberta), Dip. Psych., Cert. Psych. (Toronto), Clinical Instructor in Psychiatry (1965, 1966).

SCRAGG, Richard Dennison, BSc MD (Alberta), Instructor in Anaesthesia (1965, 1965).

SEBORG, Dale E., BS (Wisconsin), PhD (Princeton), Assistant Professor in Chemical and Petroleum Engineering (1968, 1968).

SECORD, David C., DVM (Toronto), Associate Professor and Director of Vivarium (1961, 1965).

SEGALL, Joseph Moisha Leo, MB BS (London), Sessional Instructor in Community Medicine (1965, 1965).

SEHGAL, Sudarshan Kumar, BA (Punjab), MA (Punjab), PhD (Notre Dame), Associate Professor of Mathematics (1968, 1968).

SELBY, Gordon William, MD (Manitoba), Instructor in Paediatrics (1960, 1963).

SELINGER, Zelig, MD (Montreal), Instructor in Psychiatry (1954, 1954).

SEMPLE, John E., Dip PT (England), Lecturer School of Rehabilitation Medicine, Department of Physical Therapy (1968, 1968).

SEQUIN, Herb Joseph John, BSc (Alberta), PhD (London), Associate Professor of Electrical Engineering (1966, 1966).

SEREDA, Mitro Mike, MD (Alberta), Lecturer in Medicine and Assistant Professor of Pathology (1938, 1960).

SEYER, Frederick Allan, BSc (Alberta), MS (Delaware), Assistant Professor of Chemical Engineering (1967, 1967).

SHANDRO, William Alexander, MD CM (McGill), FRCS(C), Assistant Clinical Professor of Surgery (1943, 1964).

SHANER, Ralph Faust, PhB (Lafayette College), PhD (Harvard), Sessional Lecturer in Anatomy (1921, 1962).

SHARMA, Ambikeshwar, MA (Agra), PhD (Lucknow), Professor of Mathematics (1962, 1966).

SHARMA, Mohan Lal, BA (Lucknow), Dip LS (Banaras), MSc (Western Reserve), Assistant Librarian, Public Services (1965, 1967).

SHARPLIN, Christopher David, BA (Alberta), BLS (Toronto), Assistant Librarian (1967, 1967).
SHAW, James Albon, BSc (Houston), MSc (Indiana), Associate Professor of Extension (1963, 1967).
SHAW, Miss Margaret, BSc (Alberta), Dietitian (1963, 1964).
SHEA, David Robert, BSc MD (Alberta), Intsructor in Paediatrics (1964, 1965).
SHEDDEN, Ernest R., BA LLB (Alberta), Assistant to the President (1967, 1967).
SHEININ, Saul Solomon, MA PhD (Toronto), Associate Professor of Physics (1962, 1965).
SHER, William, BL (National Yunan), MA (Minnesota), Assistant Professor of Business Administration and Commerce (1965, 1965).
SHERBANIUK, Richard William, MSc MD (Alberta), FRCP(C), Clinical Lecturer in Medicine and Infirmary Physician (1960, 1967).
SHERMAN, Ludwik, MD (Pozan), Lecturer in Medicine (1955, 1964).
SHIELDS, Leonard James, BEd (Alberta), Assistant Professor of Industrial and Vocational Education (1965, 1967).
SHIHADEH, Emile Saleem, BCom (Birmingham), MPA PhD (Cornell), Associate Professor of Business Administration and Commerce (1967, 1967).
SHIMIZU, Henry J., BSc MD (Alberta), FRCS(C), Instructor in Surgery (1963, 1965).
SHINER, Roger Alfred, BA MA (Cantab.), MA (Alberta), Assistant Professor of Philosophy (1965, 1966).
SHNITKA, Theodor Khyam, MSc MD (Alberta), Professor of Pathology (1954, 1967).
SHUMELDA, Jacob, JurD (Ukrainian Free University, Prague), MA (San Francisco College), MLS (California), Bibliographer, University Library (1967, 1967).
SIEFRIED, Neil Robert Michael, BA (Toronto), MA (Ohio State), Assistant Professor of Geography (1966, 1966).
SIEGENBERG, Joe, MB ChB (Witwatersrand), MSc (Alberta), LRCS (England), FRCS(C), Lecturer in Surgery (1963, 1967).
SIEMENS, Reynold Gerrad, BA (Manitoba), MA PhD (Wisconsin), Assistant Professor of English (1966, 1966).
SIGURDSON, Solberg Einar, BSc (Manitoba), MA (Toronto), PhD (Wisconsin), Associate Professor of Secondary Education (1964, 1967).
SILLS, Royal Cleveland, DDS (Alberta), Assistant Professor in Dentistry (1955, 1956).
SIMMONDS, Sidney Herbert, MSc (Alberta), PhD (Illinois), Associate Professor of Civil Engineering (1957, 1963).
SIMONS, Alexander Josef, Dip. (Cologne), DDS (Alberta), Associate Professor of Dentistry (1966, 1968).
SIMPSON, William John, DDS MSc (Alberta), Associate Professor and Head of Pedodontics (1965, 1965).
SINCLAIR, Robert William, BFA (Manitoba), MA (Iowa), Assistant Professor of Art (1965, 1967).
SINCLAIR, Roy George, BSc (Alberta), PhD (Massachusetts I.T.), Assistant Professor of Mathematics (1960, 1960).
SINCLAIR, Stewart Ronald, MSc (Alberta), Professor and Head of Civil Engineering (1945, 1959).
SINGH, Ishwar Chandra, FSc (Lucknow), MBBS (Agra) DTD (Amritser), Instructor in Paediatrics (1966, 1967).
SINGH, Mohan, BA, MA, Dip. in Phys Ed, BEd (Punjab), MS, Doctor of Phys Ed (Springfield), Assistant Professor in Physical Education (1967, 1968).
SITWELL, Oswald F. George, BA (Oxon.), MA (Toronto), Assistant Professor of Geography (1964, 1964).
SKOROPAD, William Peter, MSc (Alberta), PhD (Wisconsin), Professor of Plant Science (1959, 1967).
SLAVUTYCH, Yar, AM PhD (Pennsylvania), Associate Professor of Slavonic Languages (1960, 1966).
SMALL, George Roger, BA MA (Saskatchewan), MA (Toronto), Instructor in Physics (1963, 1963).
SMALL, James Matthew, BSc (Edinburgh), Assistant Professor of Educational Administration (1967, 1967).
SMILLIE, Keith William, BA (W. Ontario), MA PhD (Toronto), Professor of Computing Science (1963, 1967).
SMILLIE, Lawrence Bruce, BSc. (McMaster), MA PhD (Toronto), Professor of Biochemistry (1955, 1967).
SMITH, Alan Arthur, MMus (Toronto), Associate Professor of Elementary Education (1957, 1960).
SMITH, Alexander, QC BA LLB (Alberta, LLM JSD (Stanford), Professor of Law (1947, 1950).
SMITH, Christopher J., BSc PhD (London), Associate Professor of Biochemistry (1966, 1968).
SMITH, Dorian Glen Whitney, BSc (London), MSc (Alberta), PhD (Cantab.), MA (Oxon.), Assistant Professor of Geology (1966, 1966).
SMITH, Douglas Elstow, MA (Queen's), PhD Harvard), Professor of Psychology and Dean of Arts (1937, 1958).
SMITH, Ivan Samuel, BA (London), MA PhD (McGill), Associate Professor of Geography (1964, 1968).
SMITH, Murray Frank Robert, BEd (Alberta), Associate Professor of Physical Education (1958, 1964).
SMITH, Peter John, MA (New Zealand), PhD (Edinburgh), Associate Professor and Chairman of Geography (1959, 1967).
SMITH, Richard C., AB (Austin), BD (Louisville Presbyterian), MA (Kentucky), PhD (Illinois), Assistant Professor of Classics (1965, 1965).
SMITH, Richard Sidney, BSc MD (Alberta), MD (Karolinska), Associate Professor in Surgery (1966, 1968).
SMITH, Warren Edward, MSc (Alberta), PhD (Nebraska), Professor of Genetics (1947, 1966).
SMITH, William Donald, BPHE (Toronto), MA (Columbia), EdD (Buffalo), Professor of Physical Education (1947, 1958).
SMULSKI, John, BSc MD (Alberta), Sessional Instructor in Community Medicine (1964, 1964).
SMY, Peter Robert, BSc PhD (London), Professor of Electrical Engineering (1966, 1966).
SNELL, Bernard, LRCP LRCS DPH (Edinburgh), LRFP & S (Glasgow), MRCP FRCP (Edinburgh), Assistant Clinical Professor in Community Medicine (1961, 1967).
SNYDER, Miss Sally, BA, PhD (Washington), Associate Professor of Anthropology (1966, 1966).
SOLOMON, Robert Henry, BA, MA (Temple), Assistant Professor in English (1968, 1968).
SOLONY, Miss Natalia, BSc (Alberta), MSc, PhD (Duquesne), Lecturer in Chemistry (1966, 1967).
SOWTON, Ian Charles, MA (Toronto), Associate Professor of English (1956, 1963).
SPANER, Sidney, BA MD (Alberta), Clinical Professor of Psychiatry (1948, 1957).
SPARBY, Harry Theodore, BSc MA (Alberta), PhD (Stanford), Professor of Educational Administration (1946, 1956).
SPEAKMAN, Thomas John, MD (Manitoba), MSc (McGill), FRCS(C), FACS, Clinical Professor in Surgery, Honorary Lecturer in Physiology, and Head of Neurosurgery (1951, 1965).
SPEARMAN, Donald, MA (McGill), MA PhD (Montreal), Associate Professor of Psychology (1948, 1955).
SPENCER, Mrs. Mary, BA (Saskatchewan), MA (Bryn Mawr), PhD (California), Professor of Plant Science and Biochemistry (1953, 1964).
SPERBER, Geoffrey Hilliard, BSc BDS (Witwatersrand), MS (Rochester), Associate Professor of Dentistry (1961, 1966).
SPROULE, Brian Ralph Jessup, MSc MD (Alberta), FRCP(C), Associate Professor of Medicine (1959, 1964).
STANFORD, Henry King, BA (Birmingham Southern, MA (Princeton), Assistant Professor in Germanic Languages and General Linguistics (1966, 1967).
STANG, Edwin A., DDS (Alberta), Associate Professor of Dentistry (1961, 1967).
STANGELAND, Robert Alan, BMus (Eastman School of Music), MMus DMus (Rochester), Associate Professor of Music (1959, 1966).

STARCHUK, Orest, Lic Jur et Rer Pol, Dr Jur et Rer Pol (Chernowitz), Professor of Russian (1949, 1966).

STAYURA, Miss Lois Ann, MD (Alberta), FRCP(C), Associate Professor of Paediatrics (1965, 1966).

ST. CLAIR, William Roy, MB ChB (Edinburgh) MRCP(Ed), Clinical Lecturer in Medicine (1956, 1956).

STEIN, Richard B., BSc (MIT), MA, PhD (Oxon.), Associate Professor of Physiology (1967, 1968).

STEINER, André Louis, L ès Sc (Strasbourg), D ès Sc (Paris), Associate Professor of Zoology (1966, 1966).

STEINMETZ, Harry Charles, AB (Berkeley), MA (Los Angeles), PhD (Purdue), Visiting Professor and Student Counsellor, Psychology (1965, 1967).

STELCK, Charles Richard, MSc (Alberta), PhD (Stanford), Professor of Geology (1946, 1957).

STEPHANSON, Barney Thorvardur, BSc (Saskatchewan), MSc (Minnesota), Associate Professor of Agricultural Engineering (1946, 1951).

STEPHENS, Herbert Henry, MD (Alberta), Lecturer in Medicine (1950, 1950).

STEPHENS, Ronald Edward, BEd BA (Alberta), MMus (Oregon), Associate Professor of Elementary Education (1965, 1967).

STEPHENS-NEWSHAM, Lloyd George, BA (Saskatchewan), PhD (McGill), Associate Professor of Physiology (1966, 1966).

STERNS, Laurence Perrin, MD, CM (Queen's), Lecturer in Surgery (1966, 1967).

STEVENSON, William Alexander, BA, LLB (Alberta), Professor of Law (1962, 1968).

STEWART, Allan Greenwood, MA (Queen's), PhD (W. Ontario), Associate Professor of Paediatrics and Sessional Instructor in Biochemistry (1953, 1965).

STEWART, Derald Lawrence, DDS (Alberta), Assistant Professor of Dentistry (1966, 1966).

STEWART, Duncan Russell, DDS (Alberta), Associate Professor of Prosthetic Dentistry (1946, 1954).

STEWART, Lorne Duncan, BEd BBA (Saskatchewan), MEd (Alberta), Associate Professor of Educational Administration and Co-ordinator of Division of Field Experiences (1965, 1967).

STEWART, Max Douglas, BA BCom (Alberta), MA (Toronto), PhD (Michigan State), Associate Professor of Economics (1965, 1965).

STEWART, William H., BA (Saskatchewan) MS (Springfield), Associate Professor, Department of Extension (1967, 1968).

STEWART, Wilson Nichols, BA PhD (Wisconsin), MS (Illinois), Professor and Head of Botany (1966, 1966).

STICKEL, Ernest G., MA PhD (Western Reserve), Associate Professor of Educational Psychology (1967, 1967).

STINSON, Miss Shirley Marie, BSc (Alberta), MNA (Minnesota), Assistant Professor of Nursing (1958, 1958).

STIRRAT, James Hill, BSc MB ChB MD (Glasgow), FCAP, Assistant Professor of Pathology (1965, 1965).

ST. JOHN, Miss Muriel, BA (St. Dunstan's), BEd, BLS (Ottawa), Librarian (1968, 1968).

STRANG, Miss Judith Mary Ruth, BSc (Ottawa), MSc (Manitoba), Assistant Professor of Household Economics (1965, 1965).

STRAUSZ, Otto Peter, Lic (Eotvos Lorand, Budapest), PhD (Alberta), Associate Professor of Chemistry (1963, 1966).

STRELIOFF, Mac George, DDS (Alberta), Assistant Professor in Dentistry (1961, 1967).

STROM, Faith Marie, Dip. (Canadian Society of Lab. Technologists), BSc (Alberta), Instructor in Pathology (1967, 1967).

STROMSMOE, Keith Allan, BSc (Alberta), MSc (New Brunswick), Assistant Professor of Electrical Engineering (1963, 1963).

STRUTZ, Walter Alan, BA (Saskatchewan), MD (Alberta), FRCS(C), FACS, Instructor in Surgery (1957, 1966).

STUART, Christopher Iain John, BA, MA (Dunelm.), Professor and Head, Germanic Languages and Linguistics (1968, 1968).

STUART, William Ross, DDS (Alberta), Lecturer in Dentistry (1946, 1966).

SUBBARAO, Mathukumalli Venkata, MA, MSc, PhD (Madras), Professor of Mathematics (1963, 1968).

SUBBARAO, Mrs. Suseela, BA (Andhra Pradesh), MA (Missouri), MALS (Wisconsin), Assistant Cataloguer (1965, 1965).

SUCHOWERSKY, C. N. D Iur et Rer Pol (Czernowitz), MLA (Washington), Librarian and Assistant Professor of Slavonic Languages (1960, 1967).

SUTTON, Mrs. Juliet Sylvia, BA (Oxon.), MA PhD (Alberta), Assistant Professor of English (1965, 1965).

SWALLOW, Robert James, BA (Saskatchewan), MD (Alberta), Associate Professor of Pathology (1958. 1964).

SWANSON, Miss Audrey Lois, BA (Calgary), BLS (British Columbia), Librarian (1966, 1966).

SWARTZ, Paul, BA (Buffalo), MA (Stanford), PhD (Rochester), Professor of Psychology (1965, 1967).

SYBESMA, Miss Jetske, BFA (The Hague) MFA (Maryland), MA (Illinois), Assistant Professor of Art (1968, 1968).

SYCHUK, Maurice Jerry, BA LLB (Saskatchewan), MCL (S. Methodist), Assistant Professor of Law (1966, 1966).

SYMS, Gordon Henry, BSc (Alberta), MS, PhD, (Washington), Assistant Professor in Computing Science (1967, 1967).

TAIT, Robert James, BSc PhD (Glasgow), Associate Professor of Mathematics (1962, 1968).

TAKAHASHI, Yasushi, BSc, DSc (Nagoya), Professor of Physics (1968, 1968).

TAMAOKI, Taiki, BS (Tokyo), MSc (Purdue), PhD (Wisconsin), Associate Professor of Biochemistry (1964, 1968).

TANASIUK, Eli, MD (Alberta), LMCC (Alberta), Cert. Radiology (Royal College), Clinical Instructor (1968, 1968).

TANNAHILL, Miss Grace Dunsmore, BSc BA (Saskatchewan), Lecturer, School of Nursing (1964, 1965).

TANNER, Dennis David, BS (California), MS (Stanford), PhD (Colorado), Assistant Professor of Chemistry (1963, 1965).

TAYLOR, Albert William, BA MPE (British Columbia), PhD (Washington State), Assistant Professor of Physical Education (1967, 1967).

TAYLOR, John Benjamin, AOCA (Toronto), Associate Professor of Art, (1947, 1958).

TAYLOR, Kenneth C., BA (McMaster), MA, PhD (Princeton), Assistant Professor of History, (1968, 1968).

TAYLOR, Russell Frederick, BSc MD CM (McGill), Assistant Professor of Medicine (1965, 1965).

TAYLOR, William Clyne, MB ChB (Aberdeen), FRCP(C), Professor of Paediatrics and Honorary Instructor in Pathology (1957, 1968).

TEDESCHINI, Mario Isidor, BSc MD (Alberta), Instructor in Paediatrics (1957, 1957).

TENNESSEN, Herman, Magister Artium (Oslo), Professor of Philosophy (1961, 1968).

TERFLOTH, John H., BA (Alberta), MFA (Carnegie), PhD (Iowa), Associate Professor of Drama (1966, 1966).

THEMAN, Adolph Edward, MD (Manitoba), FR CS(C), Assistant Clinical Professor in Surgery (1957, 1966).

THEODORE, Jules A., BA (New York), DDS (Alberta), Lecturer in Dentistry (1962, 1966).

THIEMANN, Francis C., BA (Seattle), MEd (Washington), PhD (Oregon), Associate Professor of Educational Administration (1968, 1968).

TIMME, Miss Annelise, PhD (Gottingen), Associate Professor of History (1968, 1968).

THOMAS, Miss Darlene Joan, Dip. (Alberta), Lecturer, Dental Hygiene (1968, 1968).

THOMAS, Lewis Gwynne, MA (Alberta), PhD (Harvard), Professor of History (1938, 1958).

THOMAS, Lewis Herbert, MA (Saskatchewan), PhD (Minnesota), Professor and Chairman of Department of History (1964, 1965).

THOMAS, Norman Randall, BDS, BSc, PhD (Bristol), Associate Professor of Dentistry (1968, 1968).

THOMPSON, Andrew Cecil, BSc DDS (Alberta), Lecturer in Dentistry (1960, 1965).

THOMPSON, Andrew Royden, LLB (Manitoba), LLM (Toronto), Professor and acting-Dean of the Faculty of Law (1950, 1963).
THOMPSON, Donald Neil, BCom (Manitoba), MBA (California), Associate Professor of Business Administration and Commerce (1962, 1966).
THOMPSON, Miss Judith Patricia, BA (Manitoba), BLS (British Columbia), Assistant Librarian (1968, 1968).
THOMSON, Keith Heathcote, MA BEd (Alberta), EdD (California), Associate Professor of Educational Foundations (1960, 1960).
THOMSON, Stanley, BASc (Toronto), MSc PhD (Alberta), Associate Professor of Civil Engineering (1961, 1963).
THOMSON, Robert Kenneth Colquhoun, BSc MD (Alberta), Clinical Professor in Medicine (1939, 1950).
THORSEN, Walter Rollier, BS, PhD, (California Institute of Technology), Professor of Chemistry (1968, 1968).
THURSTON, Olin Gavin, BA MD (Saskatchewan), FRCS(C), Assistant Professor of Surgery (1966, 1966).
TICHENOR, Harold Duane, BS MA (Ball State Teachers College), EdD (Illinois), Associate Professor of Industrial and Vocational Education (1964, 1964).
TIPPIE, Miss Arlene Sharon, BA (Alberta), BLS (Toronto), Assistant Librarian (1967, 1967).
TKACHYK, John, MD (Alberta), Instructor in Paediatrics (1966, 1966).
TOOGOOD, John Alfred, BSc (Alberta), PhD (Minnesota), Professor and Head of Soil Science Department (1948, 1959).
TOOP, Edgar Wesley, BSA (British Columbia), MSc PhD (Ohio State), Assistant Professor of Plant Science (1962, 1962).
TOSHACH, Miss Sheila, BSc (Alberta), MA (Toronto), Associate Professor of Bacteriology (1957, 1968).
TOUPIN, Henri Maurice, BSc MD (Alberta), Instructor in Medicine (1962, 1962).
TOWNSEND, Miss Edith Edgecombe, MSc PhD (McGill), Associate Professor of Biochemistry (1962, 1968).
TOWNSEND, Robert Gordon, BSc (Saskacthewan), MD CM (McGill), Instructor in Surgery (1961, 1961).
TRAFF, Terrence Neil, BSc, MD (Alberta), Instructor in Obstetrics and Gynaecology (1966, 1966).
TRIGGS, Edward John, BPharm (Chelsea School), Assistant Professor of Pharmacy (1967, 1967).
TROLLOPE, John Reginald, MSc PhD (Alberta), Assistant Professor of Mathematics (1962, 1962).
TROLLOPE, Mrs. Zennia Montana, MSc (Alberta), Assistant Professor of Mathematics (1958, 1961).
TRUMPENER, Ulrich, BA (Oregon), MA PhD (California), Associate Professor of History (1966, 1967).
TSAI, Mrs. Rachel Jo-Chao, BS (National Taiwan), MA (Wesleyan, Conn.), MLS (Peabody), Assistant Librarian (1965, 1965).
TUBA, Jules, MSc (Saskatchewan), PhD (Toronto), Professor of Dentistry (1942, 1962).
TULLOH, Marchant Earle, MB BS (Dunelm.), Lecturer in Radiology (1963, 1966).
TURNER, Frank Watson, MB ChB (Edinburgh), MSc (Alberta), Clinical Instructor in Surgery (1966, 1966).
TURNER, George Godfrey, BA (McGill), LLB (British Columbia), BLS (Toronto), Associate Librarian (1964, 1967).
TYNDALL, David Gordon, BCom MA (Toronto), PhD (California), Vice-President of Finance and Administration (1967, 1967).
ULAN, Raymond Arthur, MD (Alberta), Assistant Professor Department of Medicine (1967, 1967).
URSCHEL, Albert R., DDS (Alberta), Sessional Lecturer in Dentistry (1958, 1958).
VALLI, Miss Gilla, BA (Alberta), BLS (British Columbia), Assistant Librarian (1968, 1968).
VAN ALSTINE, Robert Stacey, DDS (Alberta), MS (Michigan), Associate Professor and Head of Surgery-Periodontia (1953, 1961).
VANDEN BORN, William Henry, MSc (Alberta), PhD (Toronto), Associate Professor of Plant Science (1961, 1966).
VAN DE PITTE, Frederick P., PhB (Detroit), PhD (S. California), Assistant Professor of Philosophy (1966, 1966).
VAN DE PITTE, Mrs. Margaret M., PhB MA (Detroit), PhD (S. California), Assistant Professor of Philosophy (1966, 1966).
VANDER WELL, Allen Richard, BA (Central College, Iowa), MA (Iowa State), Counsellor in Student Counselling Services, Assistant Professor of Educational Psychology (1960, 1960).
VAN HEYNINGEN, Miss Elizabeth Boulina, BA (Natal), DipLibrarianship (London), Librarian (1967, 1967).
VAN STOLK, Jan Bertram, MB ChB (Capetown), Clinical Instructor in Psychiatry (1965, 1965).
VAN VLIET, Maurice Lewis, MSc (Oregon) EdD (California), Dean, Faculty of Physical Education (1945, 1964).
VARVIS, Christopher James, BSc MD (Alberta) (McGill), Instructor in Medicine (1961, 1962).
VERMEULEN, Fred Eric, BSc PhD (Alberta), MSc (British Columbia), Assistant Professor of Engineering (1967, 1967).
VERSCHUREN, Jacobus Petrus, Ir (Delft), MSc (Alberta), Associate Professor of Civil Engineering (1954, 1961).
VINGE, Miss Evangeline, BSc (British Columbia), Lecturer in Nursing (1966, 1967).
VITOVEC, Franz Hermann, Dip Ing, Dr Tech Sci (Technische Hochschule, Vienna), Professor of Mining and Metallurgy (1965, 1965).
VON BERTALANFFY, Ludwig, PhD (Vienna), Professor of Zoology (1962, 1962).
VON MAYDELL, Mrs. Ursula Mary, MSc (Alberta), Assistant Professor of Computing Science, (1963, 1965).
WAIT, Richard Harvey, MD CM (McGill, RCPS(C), Instructor in Medicine (1964, 1967).
WALDO, George S., BA (Hamilton), MA (Columbia), PhD (London), Associate Professor of Germanic Languages and General Linguistics (1966, 1966).
WALKER, Bernal Ernest, MA (Alberta), PhD (Stanford), Professor and Head of Educational Foundations (1947, 1961).
WALKER, George Brown, MA (Glasgow), PhD (London), Professor and Head of Electrical Engineering (1964, 1964).
WALKER, George William Rutherford, MA (Saskatchewan), PhD (McGill), Professor of Genetics (1963, 1965).
WALKER, Mrs. Lloanne Gayle, BA (Alberta), BLS (British Columbia), Assistant Cataloguer (1964, 1964).
WALLACE, John Douglas, MD (Alberta), Instructor in Community Medicine (1964, 1964).
WALLEY, Roc Edward, BA PhD (California), Associate Professor of Psychology (1963, 1968).
WARE, Robert Livingston, M Mus Ed (Southern Mississippi), Assistant Professor of Elementary Education (1964, 1964).
WARRACK, Allan Alexander, BSc (Alberta), MSc (Iowa State), Assistant Professor of Agricultural Economics (1967, 1967).
WARWARUK, Joseph, BSc (Alberta), MS PhD (Illinois), Associate Professor of Civil Engineering (1960, 1962).
WASS, Douglas Keith, BA MSW (Toronto), Honorary Sessional Instructor in Community Medicine (1961, 1961).
WASZILYCSAK, George Louis, BS (Maryland), MS, PhD, (Purdue), Assistant Professor in Pharmacy (1968, 1968).
WATANABE, Mamoru, BSC MD CM PhD (McGill), FRCP(C), Associate Professor of Biochemistry (1967, 1967).
WATSON, Mrs. Sheila Martin, MA (British Columbia), PhD (Toronto), Associate Professor of English (1961, 1967).
WATSON, Wilfred, BA (British Columbia), MA PhD (Toronto), Professor of English (1951, 1965).
WEAVER, Richard David, BA MEd (Eastern Washington State), Assistant Professor of English (1967, 1967).
WEBSTER, Anthony John Francis, MBVet MA (Cantab.), PhD (Glasgow), Assistant Professor of Animal Science (1966, 1966).
WEBSTER, Gordon Ritchie, MSA (British Columbia), PhD (Oregon), Associate Professor of Soil Science (1960, 1963).

WECKOWICZ, Thaddeus Eugene, MB ChB (Polish School, University of Edinburgh), DPM (Leeds), PhD (Saskatchewan), Associate Professor of Psychology and Psychiatry (1962, 1966).

WEICHMAN, Frank Ludwig, BS (Brooklyn), PhD (Northwestern), Associate Professor of Physics (1958, 1963).

WEIJER, Jan, DSc (Groningen), Professor and Chairman of Genetics and Plant Breeding (1957, 1960).

WEINLOS, Chaim Harry Wolf, BA MD (Alberta), FRCS(C), Lecturer in Surgery (1949, 1963).

WEINLOS, Morris, BA MD (Alberta), FRCS(C), Clinical Professor in Surgery Assistant Professor in Pathology (1930, 1968).

WEIR, Bryce Keith Alexander, MD CM MSc FRCS(C) (McGill), Instructor in Surgery (1967, 1967).

WEIR, Norman William Ferguson, MB BCh BAO (Queen's, Belfast), Instructor in Obstetrics and Gynaecology (1958, 1964).

WEISZ, Samuel, BSc MD (Alberta), MS (Minnesota), Instructor in Medicine (1962, 1963).

WENSEL, Ronald Harvey, BSc MD (Alberta), FRCP(C), Instructor in Physiology (1964, 1967).

WESTGATE, John Arthur, BSc (Reading), PhD (Alberta), Assistant Professor of Geology (1965, 1965).

WESTLAKE, Donald William Speck, MSc (British Columbia), PhD (Wisconsin), Associate Professor of Microbiology (1966, 1966).

WHIDDEN, John MacLean, BCom (Alberta), Bursar (1947, 1947).

WHITE, Miss Alison Genevieve, BEd (Eastern Illinois), MA (Ohio), MA (Bread Loaf), PhD (Iowa State), Associate Professor of English (1955, 1961).

WHITESIDE, Donald, BS (Wisconsin State), MS (Wisconsin), PhD (Stanford), Assistant Professor of Sociology (1967, 1967).

WHITING, Robert Harvey, BA (Toronto), MD CM (McGill), FRCP(C), Associate Clinical Professor of Medicine (1947, 1963).

WHITON, John, MA (Minnesota), Assistant Professor of Germanic Languages and General Linguistics (1967, 1967).

WHYTE, James Howden, BSc (Edinburgh), MS PhD (McGill), Professor of Botany (1939, 1958).

WHYTE, Miss Lillian Agnes, BA BEd (St. Francis Xavier), MS (Fordham), Assistant Professor in Educational Psychology (1967, 1967).

WICKENDEN, John Nicholas, BA (Alberta), MA PhD (Cantab.), Assistant Professor of History (1962, 1962).

WIEBE, Rudy H., MA (Alberta), Assistant Professor of English (1967, 1967).

WIEDRICK, Laurence George, BA (Saskatchewan), BLS (Toronto), BEd (Alberta), Associate Professor of Elementary Education (1964, 1966).

WILBERG, Robert Bernard, BEd (Alberta), MS (Oregon), Assistant Professor of Physical Education (1966, 1966).

WILCOCK, Peter Ferguson, BSc (Bishop's), MD CM (McGill), Assistant Professor of Paediatrics (1965, 1967).

WILKIE, Miss Mary Dale, BA (Manitoba), MA (Wisconsin), Assistant Professor of English (1968, 1968).

WILKINSON, Bruce William, BCom (Saskatchewan), MA (Alberta), PhD (Massachusetts Intitute of Technology), Associate Professor of Economics (1967, 1967).

WILKINSON, David, MB BS (London), Lecturer in Paediatrics (1960, 1967).

WILLIAMS, Charles Brian, BCom (British Columbia), MBA MA (Washington), PhD (Cornell), Associate Professor of Business Administration and Commerce (1964, 1966).

WILLIAMS, Gordon Donald Clarence, BSc (Manitoba), PhD (Alberta), Associate Professor and Assistant to the Head of Geology (1961, 1967).

WILLIAMS, Henry Thomas Gee, MB ChB (Liverpool), FRCS (England), FRCS(C), Assistant Clinical Professor in Surgery (1958, 1964).

WILLIAMS, Jeremy S., LLB (Sheffield), BCH (Oxon.), Assistant Professor of Law (1966, 1966).

WILLIAMSON, Donald Munro, BA MD (Alberta), Sessional Instructor in Community Medicine (1965, 1965).

WILLIS, Jackson Norman, BA BSW (Manitoba), MSW (McGill), Instructor in Community Medicine (1961, 1962).

WILLIS, Vernon Joseph, BS, PhD (Alberta), Sessional Assistant Professor in Mathematics (1968, 1968).

WILLOX, George Leslie, MD (Alberta), FRCS (C), FACS, Clinical Professor of Surgery (1951, 1957).

WILSON, Derek William Raymond, BSc PhD (Birmingham), Associate Professor of Secondary Education (1966, 1968).

WILSON, Donald Robert, BA (Oxon.), MD CM (McGill), FRCP(C), FACP, Professor and Head of the Department of Medicine (1947, 1954).

WILSON, Gordon Lochead, MD (Alberta), Lecturer in Orthopaedic Surgery (1947, 1956).

WILSON, Kellogg Van Note, MA (Nebraska), PhD (Illinois), Associate Professor of Computing Science (1965, 1965).

WILSON, Lewellyn Lee, BA (Washington), MA PhD (Northwestern), Associate Professor of Elementary Education (1961, 1966).

WILSON, Sister Mary Liguori, BA (St. Vincent), MA (St. Francis Xavier), PhD (Ottawa), Associate Professor of Elementary Education (1967, 1968).

WILSON, Robert R., MA (Chicago), Assistant Professor of English (1967, 1967).

WILSON, Thomas Charles, MD CM (Queen's), Assistant Clinical Professor in Otolaryngology (1958, 1964).

WILSON, Thomas Sidney, BSc (New Brunswick), MD (Toronto), FRCS(C), FACS, Clinical Professor of Surgery (1949, 1954).

WINDLE, Stanley Charles, BSc MD (Manitoba), Assistant Clinical Professor of Radiology (1962, 1966).

WISHART, Robert Barry, BCom. (Toronto), Administrator of Student Awards (1959, 1959).

WOHLFARTH, Harry K. H., DFA (Bonn), Hon PhD (Marconi), FIAL, Assistant Professor, Extension Department (1954, 1958).

WOJCICKI, Henry M., MB ChB MD (Edinburgh), Instructor in Psychiatry (1960, 1961).

WONDERS, William Clare, BA PhD (Toronto), MA (Syracuse), Professor of Geography (1953, 1957).

WONG, Pui Ching, MB (Lingnan), Dip Bact, PhD (London), Associate Professor of Bacteriology (1968, 1968).

WOOD, Franklin William, MSc (Alberta), Associate Professor of Food Science (1946, 1961).

WOOD, Reginald Kenneth, BE (Saskatchewan), MSc (Alberta), PhD (Northwestern), Associate Professor of Chemical and Petroleum Engineering (1966, 1967).

WOODALL, George N. C., BS Stanford), Ph. (Alberta), Instructor in Chemistry (1964, 1967).

WOODS, Stuart Brownlee, MA (Saskatchewan), PhD (British Columbia), Professor and Assistant Chairman, Department of Physics (1959, 1965).

WORTH, Walter Holmes, MEd (Alberta), EdD (Illinois), Professor of Elementary Education, Vice-President for Campus Planning and Development (1955, 1967).

WRIGHT, Miss Blaire Agnes, RN, BSc (Saskatchewan), Lecturer in Nursing (1968, 1968).

WRIGHT, Gerald H., BA (Sir George Williams), Assistant Professor of Extension (1963, 1963).

WRIGHT, John Garrick, BEd (Saskatchewan), MS (Columbia) Associate Professor of Elementary Education (1968, 1968).

WU, Miss Jean I-Jin, BA (National Taiwan), MA (Carver, Ky), MA (Indiana), Librarian (1967, 1967).

WYMAN, Max, BSc (Alberta), PhD (California I.T.), FRCS, Professor of Mathematics and Vice-President (Academic) (1943, 1964).

WYSOCKI, George Peter, BSc DDS (Alberta), Sessional Lecturer in Dentistry (1963, 1963).

YAKE, Wallace Walker, BA (Saskatchewan), MD (Alberta), Honorary Instructor in Community Medicine (1963, 1964).

YAKIMETS, Walter William, MD (Alberta), FRCS(C), Assistant Professor of Surgery (1966, 1966).

YAMAMOTO, Tatsuzo, MSc (Alberta), PhD (Yale), Associate Professor of Microbiology (1962, 1966).
YATES, Edward Norman, AOCA (Toronto), Associate Professor of Art (1954, 1964).
YONEDA, Yoshitaro, MD (Alberta), FRCS(C), FACS, Assistant Clinical Professor of Obstetrics and Gynaecology (1955, 1962).
YONGE, Keith Arnold, MD CM (McGill), DPM (London), Professor and Head of Psychiatry (1957, 1957).
YOUNG, Bruce Arthur, Bachelor of Rural Science, Master of Rural Science (New England), PhD (Australia), Assistant Professor of Animal Science (1968, 1968).
YOUNG, McLean Kenneth, MD (Alberta), Lecturer in Medicine (1949, 1964).
ZALIK, Mrs. Sara E., MS (Mexico), PhD (Illinois), Assistant Professor of Zoology (1966, 1966).
ZALIK, Saul, BSA MSc (Manitoba), PhD (Purdue), Professor of Plant Science (1952, 1964).
ZELECH, Mrs. Joanne D., BSc (Saskatchewan), MN (Washington), Assistant Professor of Nursing (1966, 1966).
ZETTER, Gerald Robert, MD (Alberta), Sessional Instructor in Community Medicine (1961, 1961).
ZIEL, Henry Richard, BS (N.Y. State College), MS (Cornell), EdD (Wayne State), Professor and Head of Industrial and Vocational Education (1962, 1962).
ZINGLE, Harvey Wilfred, MEd PhD (Alberta), Associate Professor of Educational Psychology (1964, 1967).
ZUJEWSKYJ, Oleh, MA PhD (Pennsylvania), Assistant Professor of Slavonic Languages (1966, 1966).
ZWICKE, L. Fred Charles, MSc (Washington State), PhD (British Columbia), Assistant Professor of Zoology (1967, 1967).

# 252 / HONORARY STAFF MEMBERS

BELL, Robert Edward, MD (Alberta), Dip. Clin. Path. (American Bd. Pathology), Honorary Lecturer in Pathology (1950, 1958).
BELL, Robert Edward, MD (Alberta), Honorary Lecturer in Medicine.
BRAND, Maurice H., MB BS (Dunelm.), Honorary Instructor in Preventive Medicine.
CHEPEHA, Nicholas, BEd MD (Alberta), Honorary Instructor in Community Medicine.
DOLGOY, Max, MD (Alberta), Honorary Instructor in Preventive Medicine.
FIALKOW, Simen, BA (Alberta), BSW, MSW (Manitoba), Honorary Clinical Instructor, in the Department of Psychiatry (1968, 1968).
FORD, The Honorable Frank, QC, BCL (Trinity), DCL (Toronto), LLD (Alberta and Laval), Honorary Professor of Law.
HALL, Morton Eidred, BA MB (Toronto), Honorary Associate Professor of Pathology.
HERGOTT, Clifford William, MD (Alberta), Honorary Instructor in Community Medicine.
HORNE, Margaret M., MD, Certificate (Manitoba), Honorary Clinical Instructor (1967, 1967).
HORNE, Norman Crighton, LRCP, MRCS, MB, BS (London), DPM (England), Honorary Clinical Instructor (1967, 1967).
KELEMAN, Andor, MD (Pecs), Honorary Instructor in Community Medicine.
KYLE, William Donald, BSc MD (Alberta), Honorary Instructor in Anaesthesia.
LAUERMAN, Joseph M., BSc MD (Alberta), Honorary Instructor in Community Medicine.
LLOYD, Alun, BA MD (Alberta), Honorary Instructor in Community Medicine.
MACDONALD, Miss Marie Estelle, BA (Saskatchewan and Manitoba), Honorary Clinical Instructor in Psychiatry (1965, 1965).
MacLEAN, Randall Roberts, MD (Alberta), Honorary Lecturer in Psychiatry.
MacPHEE, Harry Douglas, MB ChB (Edinburgh), Honorary Instructor in Community Medicine.
MARTLAND, The Honorable Mr. Justice Ronald, BA LLB (Alberta), BCL (Oxon), Honorary Professor of Law.
MILLER, Melvin Joseph, BSc MD (Alberta), Honorary Sessional Instructor in Social and Preventive Medicine.
POURBAIX, William Eugene, BA (Saskatchewan), MD (Alberta), Honorary Instructor in Medicine (1961, 1961).
ROSE, Patrick Blair, MD (Alberta), Honorary Instructor in Community Medicine.
SCRAGG, Richard Dennison, BSc MD (Alberta), Honorary Instructor in Anaesthesia and Pharmacology.
SOPER, Joseph Dewey, LLD (Alberta), Honorary Research Associate in Zoology.
SPRAGUE, Percy Harry, MD (Alberta), MS (Minnesota), FACP, Honorary Associate Professor of Clinical Medicine.
STEER, George Hobson, QC, MA (Queen's), LLD (Alberta and Queen's), Honorary Professor of Law.
VARVIS, Christopher James, BSc MD (Alberta), MSc (McGill), Honorary Instructor in Medicine.
WASS, Douglas Keith, BA MSW (Toronto), Honorary Sessional Instructor in Preventive Medicine.

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NEWTON, Robert, President Emeritus (1919, 1950).
BOW, Malcolm Ross, BA, MD, CM (Queen's), DPH (Toronto); Professor Emeritus of Preventive Medicine (1928, 1956).
BOWSTEAD, John Edleston, MSc PhD (Wicsonsin); Professor Emeritus of Animal Husbandry (1921, 1959).
BULYEA, Harry Ernest, DMD (Harvard), LLD (Manitoba); Professor Emeritus of Operative Dentistry (1918, 1942).
BURGESS, Cecil Scott, Professor Emeritus of Architecture (1913, 1940).
COOK, Alexander Joseph, BSc (Alberta), MA (Harvard), PhD (Chicago); Professor Emeritus of Mathematics (1924, 1961).
DOUCETTE, Andrew Leo, BSc (Dalhousie), MA (Alberta), DEd (Stanford); Professor Emeritus of Education (Calgary) (1945, 1961).
FISHER, Olive Margaret, MA (Stanford), PhD (Chicago), LLD (Alberta); Associate Professor Emeritus of Education (1945, 1950).
FRASER, Sperry David, DDS (Alberta), FACD; Professor Emeritus of Prosthetic Dentistry (1939, 1962).
GLYDE, Henry George, ARCA (London), RCA; Professor Emeritus of Fine Arts (1935, 1966).
GORDON, Robert Kay, BA (Oxon.), MA, PhD (Toronto), FRSC; Professor Emeritus of English (1913, 1950).
GRAYSON-SMITH, Hugh, MBE, MA, PhD (Toronto), FRSC; Professor Emeritus of Physics (1949, 1964).
HAMILTON, William Scott, DDS (Toronto), FACD, FDSRCS (England); Professor Emeritus of Oral Surgery (1925, 1958).
HARDY, William George, MA (Toronto), PhD (Chicago), FIAL; Professor Emeritus of Classics (1920, 1964).
HASTIE, Evangeline Alberta, BA (Toronto); Associate Professor Emeritus of Physical Education (1945, 1958).
HENRY, Arthur Wellesley Campbell, MSA (Saskatchewan), PhD (Minnesota); Professor Emeritus of Plant Science (1927, 1962).

HEPBURN, Howard Havelock, MC, MD, CM (McGill), FRCS (Edinburgh), FACS, FRCS(C); Professor Emeritus of Surgery (1923, 1951).

JAMIESON, Heber Carss, MB (Toronto), FRCP(C); Professor Emeritus of Clinical Medicine (1921, 1946).

JONES, John Thomas, (Alberta and Oxon.); Professor Emeritus of English (1922, 1964).

KEEPING, Ernest Sydney, BSc, ARCS (London), DIC; Professor Emeritus of Mathematics (1929, 1961).

LANG, Robert James, BA (McMaster), MA, PhD (Toronto), FAAAS, FAPS, FRSC; Professor Emeritus of Physics (1920, 1951).

LAZERTE, Milton Ezra, BA (Toronto), MA BEd (Alberta), PhD (Chicago), LLD (Alberta); Professor Emeritus of Education (1924, 1952).

LEITCH, Douglas Burrows, MC, BA, MD (Toronto), FRCP(C); Professor Emeritus of Paediatrics. (1923, 1957).

LORD, Goldwin Smith, MA, LLD (Mt. Allison); Professor Emeritus of Education (1945, 1950).

MACDONALD, John, MA, DLitt (Edinburgh); Professor Emeritus of Philosophy (1921, 1952).

MacEACHRAN, John Malcolm, MA, PhD (Queen's and Leipzig), LLD; Professor Emeritus of Philosophy (1909, 1945).

MacGREGOR, Hugh Alton, BSc (Alberta), MSc (Cornell), EdD (Oregon State College); Professor Emeritus of Education (1945, 1959).

McDOUGALL, William Dewar, MA (Alberta), EdD (Columbia); Professor Emeritus of Education (1945, 1961).

McINTYRE, Hazel, BSc (Alberta), MS (Ames); Professor Emeritus of Household Economics (1925, 1960).

NEWTON, John Dawson, BSA (McGill), PhD (California); Professor Emeritus of Soil Science (1922, 1959).

NICHOLS, Lawrence Howard, BA (McGill), MA (Alberta), FRMetS; Professor Emeritus of Physics (1922, 1956).

OWEN, Francis, MA (Toronto), PhD (Chicago); Professor Emeritus of Modern Languages (1920, 1952).

PATRICK, Mabel, BA (Toronto), MA (Columbia), LLD (Alberta); Professor Emeritus of Household Economics (1918, 1956).

RAWLINSON, Herbert Edward, MD (Alberta), MSc, PhD (McGill); Professor Emeritus of Anatomy (1938, 1965).

SACKVILLE, John Percy, BSA (Toronto), MS (Iowa); Professor Emeritus of Animal Science (1922, 1947).

SANDIN, Reuben Benjamin, MA (Alberta), PhD (Chicago), FRSC; Professor Emeritus of Chemistry (1922, 1964).

SCOTT, John William, MD, CM (McGill), FRCP(C), FACP; Professor Emeritus of Medicine (1923, 1959).

SHANER, Ralph Faust, PhB (Lafayette), PhD (Harvard), FRSC; Professor Emeritus of Anatomy (1921, 1959).

SHAW, Robert McLeod, BA (Dalhousie), MD, CM, DPH (McGill), FRCP(C); Professor Emeritus of Bacteriology (1921, 1950).

SIMPSON, Maimie Shaw, MSc, MEd (Alberta); Professor Emeritus of Education (1945, 1960).

SMITH, Herbert Edgar, BA (Illinois), MA, MEd (Alberta), PhD (California); Professor Emeritus of Education (1929, 1955).

SONET, Edouard, MA (Alberta), Dd'U (Rennes); Professor Emeritus of Modern Languages (1911, 1947).

STANFIELD, Edgar, MSc (Manchester); Research Professor Emeritus (1921, 1946).

THORNTON, Harold Ray, BSc (Alberta), PhD (Wisconsin); Professor Emeritus of Dairy Science (1929, 1958).

VANT, John Ross, BA (Saskatchewan), MD (Manitoba), FACS, FACOG, FRCS(C), FRCOG; Professor Emeritus of Obstetrics and Gynaecology (1932, 1962).

WARREN, Percival Sydney, BA (Toronto), ARCS (London), PhD (Toronto), FRCS; Professor Emeritus of Geology (1920, 1955).

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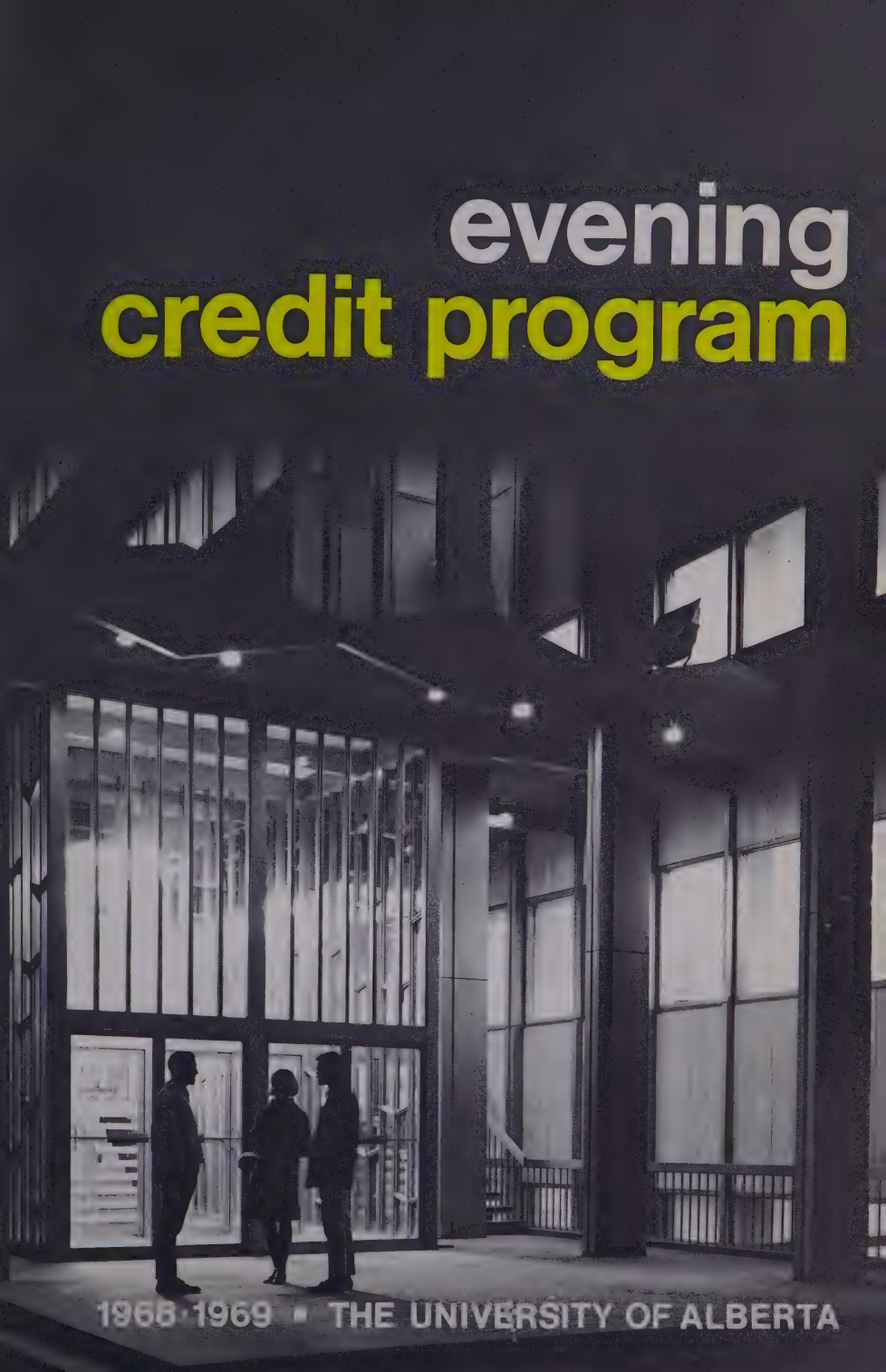
# evening credit program



1968·1969 ▪ THE UNIVERSITY OF ALBERTA

## EVENING PARKING

Evening Credit Program students attending classes at Edmonton are advised that very little free parking will be available on or near the Campus. Such parking as may be available will be in areas on the periphery of the Campus. Students wishing more convenient parking on a regular basis may purchase evening parking permits for $12.00 which will allow them to park in the evening in all areas except metered stalls and stalls reserved on a 24-hour basis. Certain metered stalls may be available to students who bring their cars on an occasional basis. Evening parking permits will be available from the Office of the Parking Supervisor, Room 117, Administration Building.

# CALENDAR

*of the*

# Evening Credit Program

*1968-69*

The University of Alberta, Edmonton

# IMPORTANT INFORMATION

## COMMUNICATIONS

Mail should be addressed to the appropriate officers at The University of Alberta, Edmonton, Alberta.

Dr. W. H. Johns, *President*

Dr. J. W. Gilles, *Director, Evening Credit Program*

Dr. D. E. Smith, *Dean, Faculty of Arts*

Dr. D. M. Ross, *Dean, Faculty of Science*

Dr. H. T. Coutts, *Dean, Faculty of Education*

Dr. A. G. McCalla, *Dean, Faculty of Graduate Studies*

Dr. H. W. Harries, *Dean, Faculty of Business Administration and Commerce*

Dr. M. L. Van Vliet, *Dean, Faculty of Physical Education*

Mr. A. D. Cairns, *Registrar*
Admission, Registration, Examinations, Records, Transcripts, Convocation.

Mr. A. J. B. Hough, *Director, Student Counselling*
Change of Faculty, Interest and Aptitude Tests, Personal Problems, Unsatisfactory Standing, Vocational Planning, Withdrawals from University.

Mr. J. M. Whidden, *Bursar*
Payment of Fees

Mr. R. B. Wishart, *Administrator of Student Awards*
Bursaries, Grants, Loans, Scholarships

## OFFICE HOURS

Monday through Friday
8:30 a.m. to 12:00 noon and 1:00 p.m. to 4:30 p.m.

Saturday
Offices closed.

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# ACADEMIC SCHEDULE

## Evening Credit Program, 1968-69

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*With respect to the Evening Credit Program this schedule takes precedence over schedules appearing in other calendars.*

**1968**

**July—**

Tuesday, 2—
Last day for receiving formal applications for undergraduate admission to the 1968-69 Session from students residing outside Canada.

Monday, 15—
Last day for receiving formal applications for undergraduate admission to the 1968-69 Session from students residing in Canada.

Monday, 22—
Last day for receiving applications for regular supplementals.

**August—**

Monday, 12—
Supplemental examinations begin.

Thursday, 15—
Last day for receiving formal applications for admission to the Faculty of Graduate Studies.

Last day for receiving registrations in the Evening Credit Program (including those of students in the Faculty of Graduate Studies). Applications for admission from new students must have been received by the deadlines referred to above.

**September—**

Tuesday, 3 to Friday, 6—
Last week for securing departmental approval of Graduate Program forms.

Saturday, 14—
Special supplemental examinations.

Monday, 16—
Evening Credit Program classes begin at Edmonton (Monday-Thursday series), and Vegreville.

Tuesday, 17—
Classes begin at Edmonton (Tuesday-Friday series), Camrose and Westlock.

Wednesday, 18—
Classes begin at Ponoka, Red Deer, and Smoky Lake.

Thursday, 19—
Classes begin at Evansburg and Viking.

Saturday, 21—
Classes begin at Grande Prairie.

**October—**

Monday, 14—
Thanksgiving Day. Classes will not meet.

Tuesday, 15—
Last day for payment of undergraduate fees without penalty.

Monday, 28—
Mid-term Test Week begins. Evening Credit Program classes will meet as usual during this week.

**November—**

Monday, 11—
Remembrance Day. Classes will not meet.

Saturday, 16—
Fall Convocation.

**December—**

Saturday, 14—
Last day of lectures in the first term.

Monday, 16 to Saturday, 21—
Mid-session examinations week.

**1969**

**January—**

Wednesday, 8—
Second term lectures begin.

**February—**

Monday, 3—
Last day for filing applications for graduate degrees and degrees in Arts, Business Administration and Commerce, Education, Pharmacy, and Science to be conferred at the Spring Convocation.

**March—**

Friday, 7 to Sunday, 9—
Second term recess. Classes will not meet.

Wednesday, 26—
Last day for receiving applications for supplemental examinations to be written in April or May.

**April—**

Friday, 4—
Good Friday. Classes will not meet.

Saturday, 12—
Last day of lectures in the Evening Credit Program.

Thursday 17—
Final examinations begin.

Wednesday, 30—
Last day for registration of students for the Summer Session.

**May—**

Friday, 9—
Notice of intention to be absent from Convocation must be given by 12:00 noon.

Tuesday, 27—
Convocation (Part I).

Wednesday, 28—
Convocation (Part II).

Thursday, 29—
Convocation (Part III).

Friday, 30—
Convocation (Part IV).

## CENTRES, COURSES AND TIMETABLES

### EDMONTON

EB — Engineering Building
ED — Education Building
HEc — Household Economics Building
T — Tory Building
V — V-Wing Lecture Amphitheatre

**Monday and Thursday, 6:30-7:45 p.m. (except as noted)**

| | |
|---|---|
| Anthropology 325 | T 1-5 |
| Anthropology 372—1st term | T 1-28 |
| Anthropology 374—2nd term | T 1-28 |
| Art 231: Sect. 91 (6:30-9:30) | ** |
| Sect. 92 " | ** |
| Sect. 93 " | ** |
| Sect. 94 " | ** |
| Business 322 (6:30-8:00) | T B125 |
| Computing Science 310 | T B105 |
| Economics 200 | T B96 |
| Economics 390 | T B121 |
| Educational Administration 526: Sect. 91 | ED 177 |
| Sect. 93 | ED 116 |
| Education CI 361: Sect. 91—1st term | ED b19 |
| Education CI 363: Sect. 91—2nd term | ED b19 |
| Educational Foundations 452 | ED 107 |
| Educational Foundations 492: Sect. 91 | ED 203 |
| Educational Psychology 421—2nd term | ED 128 |
| Educational Psychology 469: Sect. 91—1st term | ED 113 |
| Sect. 92—2nd term | ED 113 |
| Educational Psychology 471: Sect. 91—1st term | ED 122 |
| Sect. 92—2nd term | ED 122 |
| Educational Psychology 502 (6:30-8:30) | ED 176 |
| Educational Psychology 515—1st term | ED 164 |
| Educational Psychology 517: Sect. 91—1st term | ED 633A |
| Sect. 92—2nd term | ED 633A |
| Educational Psychology 571—2nd term | ED 164 |
| English 210: Sect. 91 | T B42 |
| Sect. 92 | T B50 |
| English 383 | T B57 |
| French 420 | A 111 |
| Geography 300 | T B60 |
| History 309 | T B104 |
| History 380 | T B109 |

**Classroom allocations will be posted near Room 306, Arts Building.

Linguistics 389 ..... T B113
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Sect. 92 ..... T B70
Sect. 93 ..... T B76
Philosophy 352 ..... T B100
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Psychology 489—2nd term ..... T B117
Sociology 370: Sect. 91 ..... T 1-93
Sect. 92 ..... T 1-103

**Tuesday and Friday, 6:30-7:45 p.m. (except as noted)**

Accounting 202 (6:30-9:00)—1st term ..... T B125
Accounting 204 (6:30-9:00)—2nd term ..... T B125
Art 315 (630-9:30)—2nd term ..... **
Art 325 (6:30-9:30)—2nd term ..... **
Art 335: Sect. 91 (6:30-9:30)—1st term ..... **
Sect. 92 (6:30-9:30)—1st term ..... **
Art 365 (6:30-9:30)—2nd term ..... **
*Chemistry 250 (Lecture) ..... V 111
Education CI 361: Sect. 92—1st term ..... ED b19
Education CI 363: Sect. 92—2nd term ..... ED b19
Education CI 488 ..... HEc 16
Educational Foundations 471—1st term ..... ED 113
Educational Foundations 473—2nd term ..... ED 113
Educational Foundations 492: Sect. 92 ..... ED 122
Educational Psychology 487—1st term ..... ED 128
Educational Psychology 489—2nd term ..... ED 128
Educational Psychology 512 ..... ED 107
Educational Psychology 556 (6:30-8:30) ..... ED 177
English 200 ..... T B113
English 348 ..... T B15
German 200 (6:30-8:30) ..... T B104
History 370: Sect. 91 ..... T B96
Linguistics 350: Sect. 91 ..... T B109
Mathematics 274: Sect. 91 ..... T B39
Political Science 360 ..... T B121
Psychology 341—2nd term ..... T B53
Sociology 202: Sect. 91 ..... T B90
Sect. 92 ..... T B81

**Late Afternoon Course**

Educational Psychology 554—Gifted Children. Monday and Wednesday, 4:00-5:20 p.m. For further details contact the Department.

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*Laboratory: Three hours per week, to be arranged.
**Classroom allocations will be posted near Room 306, Arts Building.

### CAMROSE

Inter D (Sociology 356) (1st term) and 456 (2nd term)—Tuesday, 6:30-9:30 p.m., Camrose Lutheran Junior College.

### EVANSBURG

Philosophy 240: Sect. 94—Thursday, 6:30-9:30 p.m., Evansburg High School.

### GRANDE PRAIRIE

English 332—Saturday, 10:00 a.m.-1:00 p.m., Montrose Junior High School.

### PONOKA

Linguistics 350: Sect. 92—Wednesday, 6:30-9:30 p.m., Ponoka Composite High School.

### RED DEER

Educational Administration 526: Sect. 92
Education CI 345 (1st term)
Education CI 347 (2nd term)
Educational Psychology 411 (2nd term)
Educational Psychology 471: Sect. 93 (1st term)
Mathematics 274: Sect. 92
Sociology 341 (1st term)
Sociology 343 (2nd term)

All classes meet Wednesday, 6:30-9:30 p.m. in the Red Deer Junior College. Classroom allocations will be posted.

### SMOKY LAKE

Educational Foundations 496: Sect. 92—Wednesday, 6:30-9:30 p.m., Harry Kostash School.

### VEGREVILLE

History 360—Monday, 6:30-9:30 p.m., Vegreville Composite High School.

### VIKING

Educational Foundations 496: Sect. 91—Thursday, 6:30-9:30 p.m., Viking High School.

### WESTLOCK

History 370: Sect. 92—Tuesday, 6:30-9:30 p.m., Westlock High School.

### COURSES AT JUNIOR COLLEGES

Students are reminded that the Junior Colleges at Camrose, Grande Prairie and Red Deer may be offering credit courses at times convenient to them. For further information contact the Deans of the Junior Colleges.

Students who take courses at a junior college for transfer of credit to a university, will register with the college not the university. It is the student's responsibility to ascertain whether the course he takes at a junior college will be accepted by his university.

## GENERAL INFORMATION

Through its Evening Credit Program, The University of Alberta offers credit courses as various centres in northern Alberta. The purpose of this program is to enable persons employed during the day either to commence or to continue their university studies. The courses provided are selected primarily to meet the needs of students working towards the following degrees: B.Ed., B.A., B.Com. (first two years only).

A student proceeding towards a first degree normally will be required to attend at least one academic year as a full-time student and complete a full year's program.

The University reserves the right to impose registration quotas or to withdraw any of the courses proposed for the 1968-69 Evening Credit Program. For this reason, it is important that students register as early as possible. The deadline for registration is August 15. New students must file applications for admission to the University not later than July 15.

### CLASSIFICATION OF STUDENTS

Students are classified as graduates, undergraduates, special and auditors.

**Graduate Students** are admitted to the Faculty of Graduate Studies in one of the following categories:

1. **Candidate for a master's degree.**
2. **Provisional candidate for a doctor's degree.** All Ph.D. and Ed.D. students are classified as provisional candidates until they have passed their Candidacy Examinations.
3. **Probationary graduate student.** One whose university record is either: (a) difficult to assess (e.g., some foreign students) or (b) below the standard normally required.
4. **Special graduate student.** One who is in every respect eligible for admission to the Faculty and who, though not registered in a degree program at this University, takes one or more graduate courses, with the permission of the department concerned.
5. **Qualifying year student.** One who is a graduate of The University of Alberta with a three-year B.A. or B.Sc. degree, or who is a graduate of another institution and has similar qualifications.

**Undergraduate Students** are those who possess full senior matriculation and who are taking one or more courses for credit towards an undergraduate degree.

**Special Students** are those who, although registered in one or more courses, are currently neither seeking credit towards a degree or diploma granted by this university.

**Auditors** are students who have been granted official permission to attend lectures in a course on the understanding that they may not participate in class discussion, assignments or examinations. The audit privilege is restricted to students who are currently registered in a degree or diploma program, and who

present to the Registrar written permission from the instructor in the course, endorsed by the student's Dean, to register in the course as an auditor.

## ADMISSION REQUIREMENTS

Matriculants from the high schools of Alberta seeking admission to the University must prossess—

(a) a high school graduation diploma with

(b) "B" (50%) or higher standing in the required courses of Grade XII as set forth in the prescriptions of the various faculties and schools, and

(c) an average in these courses of at least 60.0%.

Students from other provinces in Canada who have obtained clear senior matriculation for the University or Universities of those provinces will be admitted to The University of Alberta with clear matriculation subject to the requirements for the first year courses in each program. Students who do not have clear matriculation on this basis will be required to complete full Alberta matriculation of the faculty to which admission is sought.

The requirement of a high school diploma may be waived for adult students.

These general regulations notwithstanding, the University may, at its discretion, refuse admission to any applicant. For example, this right may be exercised in cases where applicants have written an inordinate number of examinations in order to obtain nominal entrance requirements.

Students interested in the matriculation requirements of a particular faculty or school should communicate directly with that faculty or school.

## ADMISSION PROCEDURES

### Application Forms

Prospective students who have not previously attended The University of Alberta must secure and complete Application for Admission forms and must submit them to the appropriate office by the prescribed deadline. Applicants for admission to the Faculty of Graduate Studies must obtain forms from the Dean of that Faculty. Applicants for admission to undergraduate programs or as special students may obtain them from the Registrar of the University.

### Deadlines

Applications for admisison to undergraduate programs ..... July 15

Applications for admission to Graduate Studies ..... August 15

### Transcripts

Every applicant should arrange, prior to the deadline, for the Registrar of the University (or the Dean of Graduate Studies if he is applying for entrance to that Faculty) to receive an official transcript of his high school education and one transcript (two transcripts for Graduate Studies) of any courses taken at another university or college, to be sent directly from the Department of Education or other institution maintaining such records.

**Advanced Standing**

Students from other universities may be admitted to advanced standing except in the combined courses. Extramural credits from recognized universities may be accepted under certain conditions, but such credits will not be considered beyond the first year of university work. Students who have taken the equivalent of university courses in some other manner may be excused such courses but will not be granted advanced standing in them. They will be required to substitute other courses in order to complete a program of normal weight at this university.

All applications for such admission should be addressed to the Registrar well in advance of the beginning of the session. Each application will be dealt with on its merits. The University reserves the right to require applicants for advanced standing to write examinations at any level including that of matriculation.

The amount of advanced standing that may be granted is limited by the residence requirements of The University of Alberta.

**Visé Fees**

A fee of $5.00 is charged for the evaluation of educational documents issued in Canada but outside Alberta; the fee is $10.00 for documents issued in other countries. Students entering the Faculty of Graduate Studies are exempt from visé fees.

## REGISTRATION PROCEDURES

**General**

1. A student is responsible for the completeness and accuracy of his registration. He is also responsible for any adjustments of registration made necessary by the results of supplemental examinations. Particular care should be exercised with regard to prerequisite courses.
2. No student may offer for credit in any period of twelve consecutive months more than three courses by a combination of Summer Session, Evening Credit Program or late afternoon classes, and extramural study.

**Advance Registration**

Registration forms must be completed and returned in duplicate to the Registrar of the University **not later than August 15.** These forms must be accompanied by a non-refundable registration fee of $10.00 in the case of graduate students, or by a non-refundable deposit on tuition fees of $10.00 in the case of undergraduates. Cheques and money orders must be made payable to The University of Alberta.

Students whose registrations are approved will receive from the Registrar class admission cards and a statement of fees.

**Confirmation of Registration**

Students must confirm their advance registration by handing in their class admission cards to their instructors at the first class session they attend.

**Change or Cancellation of Registration**

After confirming his registration, a student may not change from one course to another, abandon a course, or withdraw from the Evening Credit Program without first obtaining permission from the Dean or Director of his faculty or school. This permission, in the form of a "Change of Registration" or "Withdrawal" slip, signed by the Dean, must be presented to the Registrar before the change becomes official.

A student who abandons a course or withdraws from the Evening Credit Program without completing the required forms will not be eligible for any refund of fees, nor for exemption from fees in the event that he has not paid them.

**Payment of Fees**

Upon payment of fees students will receive an identification card. Registration is incomplete until fees have been paid and is subject to cancellation unless payment has been made by the final date mentioned in the following regulations.

1. Instruction fees paid for Evening Credit courses will not be credited towards instruction fees for daytime courses except in the cases of students registered in the Faculty of Graduate Studies.
2. Fees should be remitted by cheque or money order payable at par to The University of Alberta—not to any officer of the University.
3. Fees are payable at the time of advance registration. If, for any reason, payment is deferred until after receipt of a fee assessment, fees together with the fee assessment card should be sent direct to the Bursar, The University of Alberta at Edmonton.
4. The last date for the payment of fees by undergraduate students is October 15. A penalty fee of $5.00 will be charged on any payment made or postmarked subsequent to that date and must be added to any remittance mailed or delivered to the University. If payment in full has not been made by October 31, registration will be subject to cancellation and the student to exclusion from classes. **There is no provision for partial payments.**
5. The last date for the payment of fees by graduate students is October 15 or fifteen days after the date of assessment, whichever is the later. A penalty of $5.00 will be charged on any payments made or postmarked subsequent to that date. There is no provision for partial payments.
6. In case of non-attendance all fees paid, except the registration fee or the $10.00 deposit on tuition fees, will be refunded upon application to the Registrar.
7. If, after confirmation of registration, notice of withdrawal or cancellation of registration is received by the Registrar by November 30, all fees except the registration fee or the $10.00 deposit on tuition fees, will be returned. If notice is received subsequent to November 30, a **pro rata** charge from October 15 will be made and the balance refunded except that no refunds will be made where withdrawal or cancellation is subsequent to March 31.

## FEE SCHEDULE

(Fees are subject to change without prior notice)

**Undergraduate Programs**

| | |
|---|---|
| Instruction Fee: Per full-year course | $135.00 |
| Per half-year course | 67.50 |
| Auditor's Fee: Per full-year course | 12.00 |
| Per half-year course | 6.00 |

**Graduate Programs**

| | |
|---|---|
| Registration fee, per student | $ 10.00 |

Instruction fee: Part-time students will be assessed $170 per course up to the amount of the total instruction fee prescribed for the full program. Part-time students will be subject to an etxra assessment of $40.00 for each registration in excess of three. Any outstanding balance will be assessed in the student's final session.

## TEXTBOOKS

Students may obtain their textbooks from The Bookstore, The University of Alberta, Edmonton. Mail orders are invited, but will be accepted only on a C.O.D. basis.

Students are advised to purchase textbooks well in advance of the commencement of lectures. Failure to do so may result in their being unable to obtain prompt delivery at a later date due to books being temporarily out of stock. The Bookstore can fill orders provided the student gives specific information about his course and section and the centre where he will attend classes. When ordering by mail, students should use the order form included in this Calendar.

## ATTENDANCE

1. Regular attendance is expected of students in all courses. At the recommendation of the department concerned, and with the concurrence of his dean, any student having an inordinate number of unexcused absences from a course may be refused permission to take the final examination.
2. Absences are counted from the first day of the session.
3. Students who are late for a lecture or laboratory period will be marked absent unless at the end of the period in question they account satisfactorily to the instructor for their lateness.
4. Illness and Physical Disability:
   (a) Students who are absent from two or more consecutive classes in a course because of illness or disability should report the reason to the instructor upon their return.
   (b) Absence from term or final examinations. See paragraphs 5 and 6 of the next section (Examinations).

5. Students who are absent from two or more consecutive classes in a course for some valid reason other than illness should report to the instructor upon their return. If the instructor requires an absence slip, it will be the student's responsibility to have one signed by the Registrar, and show it to the instructor.

6. Students desiring leave of absence in a given course must apply to the Registrar. At the end of such period of absence, the student must present an absence slip for the Registrar's signature.

## EXAMINATIONS

1. **Final Examinations.** In courses completed in the first term, final examinations may be held either at the end of the term, or at the end of the session, at the discretion of the departments concerned. All other final examinations will be held at the end of the session.

   Also at the discretion of the departments concerned, students in the Evening Credit Program may be required to write either the same final examinations as students in the regular session, or separate final examinations.

2. **Distribution of Credits.** In each course where a final examination is held, credit of not less than 30% nor more than 70% will be assigned to term work. The remaining credit in each course will be assigned to the final examination.

3. **Grading System.** The following nine-point grading system is in effect:

| | |
|---|---|
| 9 | |
| 8 | Excellent |
| 7 | |
| 6 | Good |
| 5 | |
| 4 | Pass |
| 3 | |
| 2 | Fail |
| 1 | |

   A grade of 3 in an individual course may be accepted by a Faculty if warranted by the student's over-all academic record.

4. **Passing Grades.** For students proceeding towards an undergraduate degree the minimum passing grade is 4 unless otherwise specified; in courses taken towards a graduate degree the minimum passing grade is 6.

5. **Debarment from Final Examination.** A student may be refused permission to write a final examination in a course on the recommendation of the department concerned and with the concurrence of the dean of his faculty in the following circumstances:

   (a) The student has an inordinate number of unexcused absences.

(b) The student has neglected to do a substantial proportion of his written assignments in a course of which these are an essential feature.

(c) The student has neglected to do a substantial portion of the laboratory work in a science course.

6. **Absence from Term Examinations or Tests.** If a student has an unexcused absence from a term examination or test, the mark assigned to him will be zero. However, in case of illness the student may be excused from writing the examination or test. In applying for exemption a student must present to his instructor an absence slip signed by a physician. When exemption is granted the percentage allotted to the final examination or test missed will be added to the percentage allotted to the final examination.

7. **Absence from Final Examinations.** Any student who is ill or suffering from severe domestic affliction is advised not to sit for a final examination. Instead he should advise the Registrar at once of the circumstances and should apply for a deferred final examination. (See Item 8 below).

   If a student becomes ill or receives word of domestic affliction during the course of an examination, he should report at once to the Supervisor, hand in his unfinished paper and request that it be cancelled. Thereafter, if illness is the cause, he must report promptly to a physician so that any subsequent application for a deferred examination may be supported by a medical certificate. The Registrar should be notified of the circumstances in writing within forty-eight hours of the examination.

   **Should a student write an examination, hand in his paper for marking, and later report extenuating circumstances to support his request for cancellation of his paper and for another examination, such request will not be entertained.**

8. **Deferred Final Examinations.** A student who has missed a final examination because of illness or domestic affliction or who is obliged to absent himself from an examination for some other compelling reason (including religious convictions) may apply for a deferred final examination. Deferred examinations normally will be written during one of the regularly scheduled examination periods. All applications for deferred examinations will be referred to the student's Dean for a final decision.

9. **Statement of Record.** After each University session a statement of record is mailed to each student at the home address specified on his registration form. This should not be expected before June 15.

10. **Reappraisal of Final Examination Papers.** Since great care is taken in the marking of final examination papers, a student should apply for reappraisal of a paper only if he has good reason to believe that a mistake has been made. Reappraisals are dealt with by the head of the department in consultation with members of the staff. A request for reappraisal must be made by letter to the Registrar within thirty days after the publication of results, accompanied by a fee of $10.00 for each paper. The fee will be refunded if the grade is raised. It should

be understood that if the grade is changed, the new grade, whether higher or lower than the original, replaces it as the student's official grade in the course.

The reappraisal privilege is limited to two papers. Normally there is no such privilege for supplemental examinations.

Students awaiting the outcome of a reappraisal should make application for supplemental examinations by the prescribed deadline.

11. **Supplemental Examinations.** Supplemental examinations are conducted by the University in August. A student granted the privilege of writing supplemental examinations must do so at the time of regular supplemental examinations next following or, if given special permission by the Dean, write the regular examinations next following. A student who has failed in a course in the preceding session and who has been granted a supplemental examination should apply to the Registrar not later than the date shown in the Academic Schedule, remitting the prescribed fee. The privilege of writing supplemental examinations may be withheld by the Faculty Council if the student's grade-point average, including the course or courses failed, is below that required for promotion. Any student who returns to the University, having failed a supplemental examination or having neglected to write it, will be required to repeat the course. In certain cases an equivalent course may be prescribed instead of the failed course. The number of supplemental examinations allowed to any student is determined by the Faculty Council concerned. Notification of permission which may be granted to write one or more supplemental examinations is included in the statement of marks sent to all students.

The percentage of term marks carried forward to a supplemental examination will be determined by the Department and Faculty concerned.

12. **Examination Fees.**
    (a) Final examinations: No fee is levied for final examinations written during the regular examination periods.
    (b) Supplemental Examinations: A fee of $10.00 is charged for each supplemental examination written during a regular supplemental examinations period.
    (c) Deferred Final Examinations: A fee of $5.00 is charged for each deferred final written during regular supplemental examination periods. The fee for special deferred finals requiring the setting of special papers is $40.00 per paper.*
    (d) Special Supplemental Examinations: For special supplemental examinations a fee of $40.00 is charged for each subject.*
    (e) Outside Centres: An additional fee of $5.00 per subject is charged for writing supplemental examinations in established centres other than Edmonton.

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*Where the student has been prevented by illness or other extreme circumstance from writing at the regular time, a portion of the fee may be waived.

# THE FACULTY OF ARTS

**Students who are planning to begin work in the Faculty of Arts in the Evening Credit Program should contact the office of the Dean before registering.**

## THE GENERAL PROGRAM

**Course Requirements for the B.A.**

**First Year**

English 200; an Arts course; a laboratory Science course; two options; Physical Education.

**Second Year**

An Arts course; a Natural Science course; three options.

**Third Year**

An Arts course; a Natural Science course; three options.

**Notes:**

1. Each student must include in his program a minimum of three courses and a maximum of five in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration.
2. There may not be more than seven junior courses in the program, except by special permission of the Dean.
3. A student registering for the B.A. degree must choose his principal subject of concentration in the humanities or in the social sciences, or in mathematics.
4. To be awarded the B.A., the student must present credit in at least eight courses in the humanities and social sciences.

**Graduation Requirements**

To be granted the B.A. degree, a student must present passing grades (4 or better) in a minimum of fourteen full courses, not less than 3 in a fifteenth full course, and a grade-point average of at least 5.0 in all courses credited towards the degree after the first year.

### B.A. AFTER B.ED.

Holders of the B.Ed. degree, whose programs include thirteen Arts and Science courses, may qualify for the B.A. degree by completing a six-course program, as prescribed by the Faculty of Arts. Those with fewer than thirteen Arts and Science courses will be required to take additional courses.

### B.A. AFTER B.SC.

Students who have qualified for the degree of B.Sc. may proceed to the degree of B.A. by completing a nine-course program as prescribed by the Faculty of Arts.

## THE FACULTY OF SCIENCE

**Students who are planning to begin work in the Faculty of Science in the Evening Credit Program should contact the office of the Dean before registering.**

### THE GENERAL PROGRAM

**Course Requirements for the B.Sc.**

**First Year**

English 200 or 210; an Arts course; a Science course; two options; Physical Education.

**Second Year**

An Arts course; a Science course; three options.

**Third Year**

An Arts course; a Science course; three options.

**Notes:**

1. Each student must include in his program a minimum of three courses and a maximum of five in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration.
2. There may not be more than seven junior courses in the program, except by special permission of the Dean.
3. A student registering for the B.Sc. degree must choose his principal subject of concentration in the physical or biological sciences.
4. To be awarded the B.Sc., the student must pass at least eight science courses. Not more than eleven science courses may be credited towards the degree.

**Graduation Requirements**

To be granted the B.Sc. degree, a student must present passing grades (4 or better) in a minimum of fourteen full courses, not less than 3 in a fifteenth full course, and a grade-point average of at least 5.0 in all courses credited towards the degree after the first year.

### B.SC. AFTER B.ED.

Holders of the B.Ed. degree, whose programs include thirteen Arts and Science courses, may qualify for the B.Sc. degree by completing a six-course program, as prescribed by the Faculty of Science. Those with fewer than thirteen Arts and Science courses will be required to take additional courses.

### B.SC. AFTER B.A.

Students who have qualified for the degree of B.A. may proceed to the degree of B.Sc. by completing a nine-course program as prescribed by the Faculty of Science.

# FACULTY OF EDUCATION

## THE STANDARD ELEMENTARY B.ED. PROGRAM

### Major Fields

Each candidate must select a major field of study. A major consists of four prescribed courses, usually three Arts or Science courses, and an Education course. The following majors are available: Art, English, Early Childhood Education, French, Mathematics, Music, Physical Education, Science and Social Studies. For detailed information, consult the Calendar of the Faculty of Education.

### Degree Program for Certificated Teachers

**First Year**

Credit granted on the basis of at least seven months of teacher education.

**Second Year**

1. English 200 or 210
2. Major
3. Major
4. Arts or Science option
5. Arts or Science option
6. Senior Education option

**Third Year**

1. Educational Psychology 471 and an additional half-year course in Education Psychology at the 400 level.
2. Philosophy 240 or 242
3. Major

*4. Approved Social Science or History option

†5. Approved Arts or Science or Senior Education option

**Fourth Year**

1. Educational Foundations 492 or 496
2. Major
3. Arts or Science option

†4. Senior Education option

†5. Senior Arts or Science or Education option

**Notes on the Program:**

*1. The following courses, which are being offered in the 1967-68 Evening Credit Program, may be presented as approved options under item 4 of the program for the third year:
Economics 200, History 370, Political Science 200, Sociology 202.

†2. Only two senior Education options may be included in the third and fourth years of the program.

3. Graduation Requirement: A grade-point average of at least 5.0 on all courses credited on the last three years of the degree program. Only two standings of 3.0 will be permitted on the four-year B.Ed. program.

## THE STANDARD SECONDARY B.ED. PROGRAM

### Major Fields

Each Candidate must select a major field of study consisting of seven courses —a core of five prescribed courses and two supporting courses. The following major fields are available: English, French, German, Latin, Slavonic Languages, Social Studies, Mathematics, Biological Sciences, Physical Sciences, Art, Music, Drama, Household Economics, Business Education, Physical Education. For detailed information consult the Calendar of the Faculty of Education.

### Degree Program for Certificated Teachers

**First Year**

Credit granted on the basis of at least seven months of teacher education.

**Second Year**

1. Major
2. Major
3. Curriculum and Instruction (major field)
4. English 200 or 210
5. Approved arts option in social science or history
6. Major
7. Major or Arts or Science option

**Third Year**

1. Educational Psychology 471 and an additional half-year course in Educational Psychology of the 400 level.
2. Philosophy 240 or 242
3. Major
4. Major or Arts or Science option
5. Senior Education option

**Fourth Year**

1. Educational Foundations 492 or 496
2. Major
3. Senior Education option
4. Major or Arts or Science option
5. Major or Arts or Science option

**Notes on the Program**

1. At least three courses in the major field must be completed by the end of the second year.
2. Graduation Requiremnt: A grade-point average of at least 5.0 on all courses credited on the last three years of the degree program. Only two standings of 3.0 will be permitted on the four-year B.Ed. program.

## GRADUATE DIPLOMA PROGRAMS IN EDUCATION

The Faculty of Education sponsors a series of diploma programs providing additional special qualification in designated areas. Admission to the Graduate Diploma Program will be granted to holders of an approved degree and a Professional (in some Departments the Permanent Professional) Teaching Certificate or its equivalent. Normally, courses taken prior to the 1963 Summer

Session may not be credited toward the Diploma unless the student is currently a candidate for the M.Ed. degree. Students who now hold the M.Ed. degree may not obtain the Diploma on the basis of courses taken on the M.Ed. degree program. Courses credited toward the Diploma may not also be credited toward the B.Ed. degree. The pass mark for courses to be credited toward the Diploma is a grade 5. Residence requirements for the Diploma may be met in consecutive summer or evening sessions or in a winter session.

Diploma programs are offered by all Departments of the Faculty. Enquiries should be directed to the office of the Department concerned.

When a diploma program has been completed the student must apply to the Dean's office for the diploma on the form provided by the department concerned. Diplomas are not issued until formal application has been made.

## FACULTY OF BUSINESS ADMINISTRATION AND COMMERCE

The curriculum in the Faculty of Business Administration and Commerce is based upon a four year program. During the third and fourth years of the program the student may pursue a general course or may major in Economics, Accounting, Personnel, Finance, Production or Marketing.

The first two years of the program may be completed through the Evening Credit Program. The final two years may be taken only in the regular Winter Session.

### THE BACHELOR OF COMMERCE PROGRAM

**First Year**

Accounting 202
Business 202
Economics 200
English 210 or 200
Mathematics 240
Approved Arts or Science option

**Second Year**

Accounting 204
Business 308
Business 322
Business 332
Computing Science 351
Mathematics 243
Psychology 202

### CYCLE OF COURSES

Courses required for the first two years of the B.Com. program will be offered in the Evening Program, circumstances permitting, according to the following schedule:

| 1968-69 | 1969-70 | 1970-71 |
|---|---|---|
| Acctg 202 | Bus 202 | Bus 308 |
| Acctg 204 | Bus 332 | Cmput 351 |
| Bus 322 | Econ 200 | Econ 200 |
| Econ 200 | Engl 210 or 200 | Engl 210 or 200 |
| Engl 210 or 200 | Psycho 202 | Math 243 |
| Math 242 (in lieu of 240) | Options | Psycho 202 |
| Psycho 202 | | Options |
| Options | | |

# DETAILS OF COURSES

## GENERAL INFORMATION

1. Each course listed below is designated by its computer abbreviation and by a number which indicates the level at which it is offered. Students should use this abbreviation and number when filling in their registration forms.
2. Courses numbered at the 100-level are introductory, usually equivalent to high school courses; those numbered at the 200-level are junior, normally taken by first-year students; those numbered at the 300-level are senior, taken after the first year; those numbered at the 400-level are advanced, normally taken by third- and fourth-year students. Courses numbered at the 500- and 600-level are normally open only to graduate students.
3. The course title is followed by the symbol "•" and a number indicating the course weighting used in computing the grade-point average. Usually a half-year course carries a weighting of 3, a full-year course a weighting of 6.
4. The statement in parenthesis refers to the number of hours required by the course each week. For half-year courses the term in which the course is offered is listed first. For full-year courses the time allotment is the same in both terms. The number of lecture hours is shown first, followed by the number of laboratory hours; e.g., 3-3 indicates three hours of lectures and a three-hour laboratory each week. In some courses the lectures and laboratories are combined and this is shown as 3L. Sometimes seminar hours are also shown, indicated by an "s" after the figure; e.g., 3-1s-3 indicates three hours of lectures and one hour seminar and a three-hour laboratory.
5. Only courses marked with an asterisk (*) may be presented for credit on BA or BSc degrees.
6. The University reserves the right to impose registration quotas on, or to withdraw, any of the courses listed below.

## ACCOUNTING

***Acctg 202 •3** [Edmonton] (First Term, 3-2)

*Fundamentals of Accounting*—The language of accounting, forms of business organizations, preparation of financial statements.

INSTRUCTOR—TBA

***Acctg 204 •3** [Edmonton] (Second Term, 3-2)

*Management Accounting*—Interpretation of financial statements stressing managerial requirements.

Prerequisite: Accounting 202 or equivalent.

INSTRUCTOR—TBA

## ANTHROPOLOGY

***Anthr 325 • 6** [Edmonton] (3-0)

*Anthropology and World Problems*—An anthropological approach to some of the major problems facing the world today: relationship between indigenous peoples and industrial states; emergent societies in tropical, agrarian and formerly colonial areas. Emphasis will be on an understanding of these problems through the concept of culture and anthropological theories of cultural and social change.

Prerequisite: An introductory course in Anthropology or Sociology.

INSTRUCTOR—R. Frucht

***Anthr 372 • 3** [Edmonton] (First Term, 3-0)

*Peoples and Cultures of South Asia*—Study of the major culture groups of South Asia: India, Pakistan and Ceylon; origins and development, modern forms and functioning, trends of change.

Prerequisite: A course in Anthropology or Sociology, or consent of the Department.

INSTRUCTOR—C. S. Brant

***Anthr 374 • 3** [Edmonton] (Second Term, 3-0)

*Peoples and Cultures of East Asia*—Study of the major culture groups of East Asia: China, Japan, Korea. Origins and development; modern forms and functioning; trends of change.

INSTRUCTOR—C. S. Brant

## ART

***Art 231 • 6** [Edmonton] (2-4)

*Fundamentals of Visual Communication I*—A studio-based course concerned with the analysis of information expressed visually in two and three dimensions, and with illusion implied by line and colour.

INSTRUCTOR—TBA

***Art 315 • 3** [Edmonton] (Second Term, 2-4)

*Fundamentals of Painting*—A study of the application of principles of visual communication in the context of painting, including a survey of materials and techniques.

Prerequisite: Art 231 or consent of the Department.

Corequisite: Arts 335 (Must be taken in first term).

INSTRUCTOR—TBA

***Art 325 • 3** [Edmonton] (Second Term, 2-4)

*Fundamentals of Printmaking*—A study of the application of principles of visual communication in the context of printmaking, including a survey of the tools, techniques and materials available.

Prerequisite: Art 231 or consent of the Department.

Corequisite: Art 335 (Must be taken in first term).

INSTRUCTOR—TBA

***Art 335** •3 [Edmonton] (First Term, 2-4)

*Visual Communication I*—Further study in depth of elements of visual communication and their possible use.

Prerequisite: Art 231.

INSTRUCTOR—TBA

***Art 355** •3 [Edmonton] (Second Term, 2-4)

*Fundamentals of Sculpture*—A study of the application of principles of visual communication in the context of sculpture, including a survey of tools, techniques and materials available.

Prerequisite: Art 231 or consent of the Department.

Corequisite: Art 335 (Must be taken in first term).

INSTRUCTOR—TBA

## BUSINESS

**Bus 322** •6 [Edmonton] (2-2s)

*Managerial Economics*—Internal factors influencing prices, costs, output and growth of a business enterprise.

Prerequisite: Economics 200.

INSTRUCTOR—TBA

## CHEMISTRY

***Chem 250** •6 [Edmonton] (3-1s-3)

*Organic Chemistry*—Lectures: An introduction to a study of the compounds of carbon.

Laboratory: The preparation of some organic compounds.

Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

INSTRUCTOR—TBA

## COMPUTING SCIENCE

***Cmput 310** •6 [Edmonton] (3-0)

*Elements of Programming*—Structure of computers; instructions, algorithms and programs: languages of computer programming; conventional computers; assemblers and compilers.

INSTRUCTOR—Doreen Heaps

## ECONOMICS

***Econ 200** •6 [Edmonton] (3-0)

*Principles of Economics*—A survey of various aspects of economics; the nature of economics problems and systems; the functions of money; commercial and central banking; national income analysis; monetary and fiscal policy; pricing under competitive and monopolistic conditions; selected topics in analysis and policy.

INSTRUCTOR—C. Steinberg

***Econ 390** •6 [Edmonton] (3-0)

*Comparative Economics Systems*—A comparative study of the institutions and theories of important contemporary systems of economics organization, with emphasis on the "mixed" capital system, "command" economics of the Soviet type, and transitional systems embodying socialist as well as capitalist principles. A survey of socialist economic throught with emphasis on the economics of Marx.

Prerequisite: Economics 200 or consent of the Department.

INSTRUCTOR—I. Moravcik

## EDUCATIONAL ADMINISTRATION

**Ed Adm 526** • 6 [Edmonton and Red Deer] (3-0)

*Administration of Educational Personnel*—The supervisory functions of staffing, consulting, and motivating, including such topics as selection and placement, teacher evaluation, in-service training, individual consultation, leadership, teacher morale, use of authority, and organization for supervision.

INSTRUCTORS—Edmonton: A. E. Holdaway
Red Deer: P. J. Atherton

## EDUCATION: CURRICULUM AND INSTRUCTION

**Ed CI 345** • 3 [Red Deer] (First Term, 3-0)

*Introduction to School Libraries.*

Prerequisite: A teaching certificate.

**Note:** Not open to students with credit in Ed CI 346.

INSTRUCTOR—Olga Anderson

**Ed CI 347** • 3 [Red Deer] (Second Term, 3-0)

*School Library Services.*

Prerequisite: Ed CI 345 or consent of the Department of Elementary Education.

**Note:** Not open to students with credit in Ed CI 346.

INSTRUCTOR—Olga Anderson

**Ed CI 361** • 3 [Edmonton] (First Term, 3L)

*Audiovisual Instruction I*—Theory of audiovisual instruction; types of communications media; principles and techniques of teaching with such media; preparation of selected audiovisual materials; operation and care of specialized equipment.

INSTRUCTORS—K. L. Bowers and W. R. Dralle

**Ed CI 363** • 3 [Edmonton] (Second Term, 3L)

*Audiovisual Instruction II*—Selected case studies; experimental and developmental uses of instructional devices; implications for the classroom teacher, the individual learner, class and school organization, and the aims and purposes of education.

Prerequisite: Ed CI 361.

INSTRUCTORS—K. L. Bowers and W. R. Dralle

**Ed CI 431** • 3 [Edmonton] (First Term, 3-0)

*Instruction in Elementary School Science.*

Prerequisite: Ed CI 231 or equivalent.

**Note:** Not open to students with credit in Ed CI 432.

INSTRUCTOR—TBA

**Ed CI 433** • 3 [Edmonton] (Second Term, 3-0)

*Curriculum in Elementary School Science.*

Prerequisite: Ed CI 431 and at least one laboratory science course or consent of the Department of Elementary Education.

**Note:** Not open to students with credit in Ed CI 432.

INSTRUCTOR—TBA

**Ed CI 488** •6 [Edmonton] (3-0)

*Advanced Curriculum and Instruction in Secondary School Household Economics.*

Prerequisite: Ed CI 286 or 486 or consent of Department of Secondary Education.

INSTRUCTION—Edith Down

## EDUCATIONAL FOUNDATIONS

**Ed Fdn 452** •6 [Edmonton] (3-0)

*Issues in Contemporary Education*—A critical examination of selected educational issues with special reference to Canada.

INSTRUCTOR—M. R. Lupul

**Ed Fdn 471** •3 [Edmonton] (First Term, 3-0)

*Contemporary Systems of Education in Western Europe, the U.S.A. and the U.S.S.R.*

INSTRUCTOR—D. R. Pugh

**Ed Fdn 473** •3 [Edmonton] (Second Term, 3-0)

*Contemporary Systems of Education in Selected Countries of Asia and Africa.*

INSTRUCTOR—D. R. Pugh

**Ed Fdn 492** •6 [Edmonton] (3-0)

*Philosophy of Education*—A philosophical examination of the logical connection between philosophical theories and recommendations about the aims and practices of education. Attention will be given to the analysis of conceptual problems involved in the understanding and assessment of educational theory and practice.

Prerequisite: Philosophy 240 or 242. For holders of approved degrees other basic philosophy courses may be accepted by the Department.

INSTRUCTORS—N. C. Bhattacharyya and A. Kaufman

**Ed Fdn 496** •6 [Smoky Lake and Viking] (3-0)

*History of Educational Thought*—An historical study of the significance of the contributions of thinkers whose intellectual activities have influenced educational theories and practices in the Western World.

Prerequisite: Philosophy 240 or 242. For holders or approved degrees other basic philosophy courses may be accepted by the department.

INSTRUCTORS—Smoky Lake: R. S. Patterson
Viking: P. J. Miller

## EDUCATIONAL PSYCHOLOGY

**Ed Psy 411** •3 [Red Deer] (Second Term, 3-0)

*Introduction to Guidance.*

Prerequisite: Ed Psy 269 and 271, or 276.

**Note:** Not open to students with credit in Ed Psy 308.

INSTRUCTOR—A. Herman

**Ed Psy 421** •3 [Edmonton] (Second Term, 3-0)
*Personal and Social Dynamics in Education.*
Prerequisite: Ed Psy 269 and 271 or equivalents.
INSTRUCTOR—L. Eberlein

**Ed Psy 469** •3 [Edmonton] (Either Term, 3-0)
*Human Development and Education.*
Prerequisite: Ed Psy 269 or 276.
INSTRUCTOR—A. Coté

**Ed Psy 471** •3 [Edmonton: Either Term, 3-0] [Red Deer: First Term, 3-0]
*Learning and Instruction.*
Prerequisite: Ed Psy 271 or 276.
**Note:** Not open to students with credit in Ed Psy 476.
INSTRUCTORS—Edmonton: J. C. Powell
Red Deer: G. Lefrancois

**Ed Psy 487** •3 [Edmonton] (First Term, 3-0)
*The Measurement of Educational Objectives.*
Prerequisite: Ed Psy 276, or 269 and 271, or equivalent.
**Note:** Not open to students with credit in Ed Psy 478.
INSTRUCTOR—R. Gupta

**Ed Psy 489** •3 [Edmonton] (Second Term, 3-0)
*Test Construction for Teachers*
Prerequisite: Ed Psy 276, or 269 and 271, or equivalent.
**Note:** Not open to students with credit in Ed Psy 478.
INSTRUCTOR—R. Gupta

**Ed Psy 502** •6 [Edmonton] (3-1)
*Introduction to Educational Research.*
INSTRUCTOR—J. Bicknell

**Ed Psy 512** •6 [Edmonton] (3-3)
*Seminar and Practicum in Counselling.*
Prerequisite: Consent of Department.
INSTRUCTOR—TBA

**Ed Psy 515** •3 [Edmonton] (First Term, 3-0)
*Theories of Personality.*
INSTRUCTOR—L. Eberlein

**Ed Psy 517** •3 [Edmonton] (Either Term, 3-0)
*Group Processes in the School.*
**Note:** Ed Psy 517 provides experience in a "basic encounter" group the purpose of which is to increase sensitivity and awareness in social interaction. Because of the nature of this course, registration will be limited to a maximum of ten students in each term. Credit only (not specific grades) will be given in the course.
INSTRUCTOR—P. Koziey

**Ed Psy 556** •6 [Edmonton] (3-1)
*Psychology and Education of Emotionally Disturbed and Socially Maladjusted Children.*
INSTRUCTOR—C. A. Norman

**Ed Psy 571** •3 [Edmonton] (Second Term, 3-0)
*Advanced Educational Psychology: Learning.*
Prerequisite: Ed Psy 471 or equivalent.
INSTRUCTOR—G. Lefrancios

## ENGLISH

***Engl 200** •6 [Edmonton] (3-0)
*A Survey of English Literature from Chaucer to the Twentieth Century*—A close study of representative masterpieces. Essays and tests on the prescribed literature will be given to afford practice in setting down ideas in good English.
INSTRUCTOR—H. V. Olson

***Engl 210** •6 [Edmonton] (3-0)
*English Language and Literature*—English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.
INSTRUCTOR—T. J. Matheson

***Engl 332** •6 [Grande Prairie] (3-0)
*Shakespeare*—A study of a selection of Shakespeare's plays. Eighteen plays will be discussed, not all in great detail. Among the eighteen will be the following: *Love's Labour's Lost, As You Like it, The Tempest, Troilus and Cressida, Richard II, I Henry IV, Henery V, Romeo and Juliet, Julius Caesar, Antony and Cleopatra, Hamlet, King Lear, Macbeth, Othello.*
Prerequisite: English 200 or 210.
INSTRUCTOR—L. Logie

***Engl 348** •6 [Edmonton] (3-0)
*Restoration and Eighteenth Century Literature*—Special study of representative works of Dryden, Swift, Pope, Addison, and Johnson, with additional reading in the drama, poety, and prose of the period.
Prerequisite: English 200 or 210.
INSTRUCTOR—D. C. Butler

***Engl 383** •6 [Edmonton] (3-0)
*American Literature from 1900*—A selection of representative major writers from 1900 to the present.
Prerequisite: English 200 or 210.
**Note:** Not to be taken by students with credit in English 394.
INSTRUCTOR—Lenore Noujaim

## FRENCH

***Fren 420** •6 [Edmonton] (3-0)
*Introduction to French-Canadian Literature*
Prerequisite: Two senior French courses.
INSTRUCTOR—R. Bonvalet

## GEOGRAPHY

***Geog 300** ◆6 [Edmonton] (3-0)

*Human Geography*—The significance of human distribution on the earth. Man's relation to the physical environment; world population problems; cultural patterns in the world; aspects of political and economic geography in selected world trouble areas; racial geography and urban geography. Students planning on taking this course are strongly urged to precede it by Geography 201.

**Note:** Geography 300 is classified as a social science.

INSTRUCTOR—V. B. Proudfoot

## GERMAN

***Germ 200** ◆6 [Edmonton] (3-1)

*First Year University German*—This course is devoted to the development of the student's ability in speaking, reading and writing German, using modern short stories, cultural readers and audio-visual aids.

Prerequisite: German 30, German 100 or equivalent.

INSTRUCTOR—TBA

## HISTORY

***Hist 309** ◆6 [Edmonton] (3-0)

*Revolutionary and Nineteenth Century Europe*

INSTRUCTOR—J. Tobias

***Hist 360** ◆6 [Vegreville] (3-0)

*American History, 1492-1941.*

INSTRUCTOR—C. Young

***Hist 370** ◆6 [Edmonton and Westlock] (3-0)

*Canada*—A survey of the political and social history of Canada.

INSTRUCTORS—Edmonton: P. Ward
Westlock: E. A. Mitchner

***Hist 380** ◆6 [Edmonton] (3-0)

*The Far East*—A survey of the histories of China and Japan.

INSTRUCTOR—Hazel Jones

## INTERDEPARTMENTAL COURSES

***Inter D 356** ◆3 [Camrose] (First Term, 3-0)

*Sociology of Rural Life*—A study of the rural community and rural social systems, with special reference to changes in the rural way of life.

Prerequisite: Sociology 202 or 403 or R Soc 300 or consent of the Department of Sociology or Agricultural Economics.

**Note:** Not open to students with credit in Sociology 356 or Rural Sociology 356.

INSTRUCTOR—D. Murri

***Inter D 456** ♦3 [Camrose] (Second Term, 3-0)

*Rural Social Problems and Public Policy*—Social problems in Canadian rural life; analysis of policy making processes related to these problems.

Prerequisite: Sociology 202 or 403 or Ag 367 or R Soc 356 or consent of the Department of Sociology or Agricultural Economics.

**Note:** Not open to students with credit in Sociology 456 or Rural Sociology 456.

INSTRUCTOR—D. Murri

## LINGUISTICS

***Ling 350** ♦6 [Edmonton and Ponoka] (3-0)

*General Linguistics*—An introduction to the study of language in its structural and historical aspects. Examples will be drawn from modern European languages.

INSTRUCTORS—Edmonton: TBA
Ponoka: D. Watkins

***Ling 389** ♦6 [Edmonton] (3-0)

*Modern English Grammar*—A survey of several approaches to the description of modern English grammar.

INSTRUCTOR—Lois Marekworth

## MATHEMATICS

***Math 242** ♦6 [Edmonton] (3-1)

*Algebra, Elementary Calculus and Probability*—Elementary algebraic operations. Graphs of polynomial functions. Exponents and logarithms. Permutations and combinations. The Binomial Theorem. Arithmetic and geometric progressions. Calculus of polynomial functions. Maxima and Minima.

Probability models, Sampling. Product Models. Conditional Probability. Random variables. Special distributions. Multivariate distributions.

Prerequisite: Mathematics 30 or equivalent.

INSTRUCTOR—A. H. Rhemtulla

***Math 274** ♦6 [Edmonton and Red Deer) (3-0)

*Algebra*—Logic and sets. Rotation of axes. Linear equations. Vectors, matrices and determinants. Mathematical systems (scales of notation). Mathematical induction. Binomial theorem. The axiomatic approach to the number system. General algebraic systems.

Prerequisite: Mathemtics 30.

INSTRUCTORS—Edmonton: R. Sinclair
Red Deer: H. I. Freedman

***Math 307** ♦6 [Edmonton] (5-0)

*Calculus and Analytic Geometry* (Arts and Education)—Polar coordinates. Rotation of axes. Analytical geometry of three dimensions. Partial derivatives. Multiple integrals. Sequences and series. Introductory differential equations.

Prerequisite: Mathematics 207 or equivalent.

INSTRUCTOR—G. Ludwig

## PHILOSOPHY

***Phil 240** • 6 [Edmonton and Evansburg] (3-0)

*Introduction to Western Philosophy*—This course is designed to introduce the student to the main problems and theories that have dominated philosophical thought in the Western world, through the study and discussion of selected philosophical classics. Emphasis will be placed both upon a sound acquaintance with the main outlines of our philosophical tradition and upon the ability to handle philosophical ideas independently. To this end both lectures and discussions will form part of the student's training.

INSTRUCTORS—Edmonton: E. W. Kemp, K. I. Mills and P. Shiner
Evansburg: M. H. Kelley

***Phil 352** • 6 [Edmonton] (3-0)

*Social Philosophy*—A philosophical and synoptic study of the nature of society.

INSTRUCTOR—D. Hicks

## POLITICAL SCIENCE

***Pol S 200** • 6 [Edmonton] (3-0)

*Elements of Political Science*—A study of the principles and practices of modern government, with emphasis on the democratic constitutional state. Among the topics studied are the nature and theory of the state; types of constitutions; the functions and composition of the legislature, executive and judiciary; representation; political parties and pressure groups.

INSTRUCTOR—E. P. Murray

***Pol S 360** • 6 [Edmonton] (3-0)

*International Politics*—A study from the viewpoint of political science of the elements and general nature of the relations between modern states. The framework and functioning of international institutions—law, diplomacy and organization—is studied and attention is paid to the political and other forces at work, including the role of power and the efforts to achieve international peace.

INSTRUCTOR—J. A. Lejnieks

## PSYCHOLOGY

***Psycho 202** • 6 [Edmonton] (3-0)

*Introduction to General Psychology*—A survey of problems, methods and principles in various fields of psychology.

INSTRUCTOR—F. Bleck

***Psycho 341** • 3 [Edmonton] (Second Term, 3-0)

*Social Psychology*—An introduction to the study of individual and group behaviour observed in social processes.

Prerequisite: Psychology 202 or Sociology 202.

**Note:** Psychology 341 and Sociology 341 may not both be taken for credit.

INSTRUCTOR—TBA

***Psycho 383** ♦3 [Edmonton] (First Term, 3-0)

*Personality*—An introductory survey of the area of personality including a study of representative theoretical points of view and research relevant to the major problems in this area.

Prerequisite: Psychology 202 or Ed Psy 276, 269 or 271, or consent of the Department.

INSTRUCTOR—E. Howarth

***Psycho 489** ♦3 [Edmonton] (Second Term, 3-0)

*Abnormal Psychology*—A general introduction to abnormal psychology.

Prerequisite: Psychology 202 or Ed Psy 276, 269 or 271, and Psychology 383; or consent of the Department.

INSTRUCTOR—K. Dobrowski

## RURAL SOCIOLOGY

**See courses listed under Interdepartmental Courses**

## SOCIOLOGY

**Note: See also courses listed under Interdepartmental Courses**

***Soc 202** ♦[Edmonton] (3-0)

*Introductory Sociology*—An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society is analysed in terms of its structure, culture and social ranking schemes. The interrelationship between the various institutions (e.g. family, church, school, government) are considered. The processes are examined whereby the individual is socialized into society, as are the sources of conformist and non-conformist behavior.

INSTRUCTORS—G. K. Hirabayashi and Associates

***Soc 341** ♦[Red Deer] (First Term, 3-0)

*Social Psychology*—An introduction to the study of individual and group behavior observed in social processes.

Prerequisite: Sociology 202 or 403 or Psychology 202 or Educational Psychology 276.

**Note:** Sociology 341 and Psychology 341 may not both be taken for credit.

INSTRUCTOR—W. Meloff

***Soc 343** ♦3 [Red Deer] (Second Term, 3-0)

*Collective Behaviour*—Analysis of various forms of collective behavior, including crowds, mobs, social movements, and fugitive behavior patterns.

Prerequisite: Sociology 341 or Psychology 341 or consent of the Department.

INSTRUCTOR—W. Meloff

***Soc 370** ♦6 [Edmonton] (3-0)

*The Family*—Structure and functions of the family, comparative family systems, sociology of family life stages (such as childhood, adolescence, adulthood, old age), contemporary trends and problems of the family.

INSTRUCTORS—L. Larson and A. S. A. Mohsen

## ACADEMIC STAFF

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**PUGH, D. R.**, M.A., M.Ed., Associate Professor, Department of Educational Foundations.

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50th ANNIVERSARY

# '68 SUMMER SESSION

THE UNIVERSITY OF ALBERTA · EDMONTON

# Important Information

## DEADLINES

**April 1.** Last day for receiving applications for admission to The University of Alberta.

**April 30.** Last day for receiving Summer Session registrations and changes of registration.

## REGISTRATION QUOTAS

Since all courses are subject to registration quotas, early registration is advisable.

## COURSE LOAD

One full-year course, or the equivalent, is regarded as the normal load for Summer Session students. However, students with good academic records may be permitted by their Faculties to register to a maximum of two full-year courses or the equivalent. Decisions with respect to the quality of a student's academic record normally will be based on the equivalent of a year's university work completed previously.

## SPECIAL SUMMER SESSION FEATURES

1. Summer Courses in Rome: Art 300 (p. 39); Classics 459 (p. 40).
2. Summer School of Linguistics. See page 36.

## MOTOR VEHICLES

All Summer Session students operating a motor vehicle on the Campus are required to register it with the Parking Supervisor, Room 117, Administration Building. Registration forms will be mailed to all Summer Session students along with their class admission cards. A valid "pink card" must be presented at the time of registration of the vehicle.

Parking facilities for students are very limited. A small amount of reserved parking may be available for a nominal fee, on application to the Parking Supervisor.

Students are advised to familiarize themselves with the Traffic and Parking Regulations printed on the back of the vehicle registration form. Traffic tickets are issued for violations of these Regulations and carry a fine of $5.00 for non-registration of a vehicle and $2.00 for each parking offence.

*A directory of important University administrative offices will be found on the inside of the back cover of this Calendar.*

THE UNIVERSITY OF ALBERTA

*Fiftieth*

# SUMMER SESSION

*1968*

*Edmonton, Alberta*

## COMMUNICATIONS

Mail should be addressed to the appropriate officer at The University of Alberta, Edmonton, Alberta.

Dr. W. H. Johns, *President*

Dr. J. W. Gilles, *Director, Summer Session*

Dr. D. E. Smith, *Dean, Faculty of Arts*

Dr. D. M. Ross, *Dean, Faculty of Science*

Dr. H. T. Coutts, *Dean, Faculty of Education*

Dr. M. J. Huston, *Dean, Faculty of Pharmacy*

Dr. A. G. McCalla, *Dean, Faculty of Graduate Studies*

Dr. H. W. Harries, *Dean, Faculty of Business Administration and Commerce*

Dr. M. L. Van Vliet, *Dean, Faculty of Physical Education*

Miss Ruth McClure, *Director, School of Nursing*

Dr. Elizabeth Empey, *Director, School of Household Economics*

Mr. A. D. Cairns, *Registrar*
Admissions, Registration, Examinations, Records, Transcripts, Convocation.

Mr. A. J. B. Hough, *Director, Student Counselling*
Change of Faculty, Interest and Aptitude Tests, Personal Problems, Unsatisfactory Standing, Vocational Planning, Withdrawals from University

Mr. J. M. Whidden, *Bursar*
Health Service, Payment of Fees

Mr. R. B. Wishart, *Administrator of Student Awards*
Bursaries, Grants, Loans, Scholarships

Mr. D. A. Bone, *Director, Housing and Food Services*
Residence Accommodation, Off-campus Housing

## OFFICE HOURS

Monday through Friday
8:30 a.m. to 12:00 noon and 1:00 p.m. to 4:30 p.m.

Saturday
Offices closed.

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# ACADEMIC SCHEDULE

**Summer Session, 1968**

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**April—**

**Monday, 1—**

Last day for receiving Summer Session registrations with entitlement to discount on tuition fees.

Last day for receiving applications for admission from new students, undergraduate or graduate, who wish to enter the University in the 1968 Summer Session.

**Tuesday, 30—**

Last day for receiving Summer Session registrations and changes in registration.

**June—**

**Wednesday, 5—**

Last day for payment of Summer Session fees without penalty.

**July—**

**Tuesday, 2—**

8:00 a.m.—First day of lectures in the first term.

9:00 a.m.-11:00 a.m.
12:00 noon- 2:00 p.m.
} Confirmation of registration: Education Building, Arts Building, Tory Building, Physics-Computing Science and Chemistry Buildings.

**Thursday, 9—**

Last day for payment of Summer Session fees.

**Monday, 22—**

Last day of lectures in the first term.

**Tuesday, 23—**

Final examinations in courses terminating in the first term.

**Wednesday, 24—**

First day of lectures in the second term.

**August—**

**Tuesday, 13—**

Last day of lectures in the second term.

**Wednesday, 14—**

Final examinations commence in full-session and second-term courses.

# GENERAL SECTION

In the Summer Session, The University of Alberta offers a wide selection of courses for the convenience of students who are unable to attend the regular sessions. Special attention is given to meeting the needs of teachers desirous of improving their professional qualifications.

An important feature of the Summer Session is the requirement that a substantial portion of course content must be mastered before the session opens. The reason for this requirement is that summer courses carry the same credit as regular session courses, even though the summer term is of only six weeks' duration.

The deadline for registration is April 30. For students who have not attended the University previously, the deadline for application for admission is April 1.

The University reserves the right to limit registration in, or to withdraw, any of the courses proposed for the 1968 Summer Session.

**Since all courses are subject to registration quotas, students are advised to register as early as possible.**

## CLASSIFICATION OF STUDENTS

In the Summer Session students are classified as graduates, undergraduates, special, and auditors.

**Graduate Students** are admitted to the Faculty of Graduate Studies in one of the following categories:

1. **Candidate for a master's degree.**
2. **Provisional candidate for a doctor's degree.** All Ph.D. and Ed.D. students are classified as provisional candidates until they have passed their Candidacy Examinations.
3. **Probationary graduate student.** One whose university record is either: (a) difficult to assess (e.g., some foreign students) or (b) below the standard normally required.
4. **Special graduate student.** One who is in every respect eligible for admission to the Faculty and who, though not registered in a degree program at this University, takes one or more graduate courses, with the permission of the department concerned.
5. **Qualifying year student.** One who is a graduate of The University of Alberta with a three-year B.A. or B.Sc. degree, or who is a graduate of another institution and has similar qualifications.

**Special Students** are those who, although registered in one or more courses, are currently not seeking credit towards a degree or diploma granted by this university.

**Auditors** are students who have been granted official permission to attend lectures in a course on the understanding that they may not participate in class discussions, assignments or examinations. The audit privilege is restricted

to students who are currently registered in a degree or diploma program and who present to the Registrar written permission from the instructor in the course, endorsed by the student's Dean, to register in the course as an auditor.

Students should not seek permission to audit courses until after the commencement of lectures.

## ADMISSION REQUIREMENTS

Matriculants from the high schools of Alberta seeking admission to the University must possess—

(a) a high school graduation diploma with

(b) "B" (50%) or higher standing in the required courses of Grade XII as set forth in the prescriptions of the various faculties and schools, and

(c) an average in these courses of at least 60.0%.

Students from other provinces in Canada who have obtained clear senior matriculation for the University or Universities of those provinces will be admitted to The University of Alberta with clear matriculation subject to the requirements for the first year courses in each program. Students who do not have clear matriculation on this basis will be required to complete full Alberta matriculation of the faculty to which admission is sought.

The requirement of a high school diploma may be waived for adult students.

These general regulations notwithstanding, the University may, at its discretion, refuse admission to any applicant. For example, this right may be exercised in cases where applicants have written an inordinate number of examinations in order to obtain nominal entrance requirements.

Students interested in the matriculation requirements of a particular faculty or school should communicate directly with that faculty or school.

## ADMISSION PROCEDURES

### Application Forms

Prospective Summer Session students who have not previously attended The University of Alberta must secure and complete Application for Admission forms and must submit them to the appropriate office by April 1.*

Applicants for admission to undergraduate programs or as special students may obtain forms from the Registrar of the University at Edmonton. Application forms for admission to the Faculty of Graduate Studies may be obtained only from the office of the Dean of that Faculty.

### Transcripts

Every applicant should arrange, **prior to the deadline**, for the Registrar of the University (or the Dean of Graduate Studies if he is applying for entrance to that Faculty) to receive an **official transcript** of his high school education and one transcript (two transcripts for Graduate Studies) of any courses taken at another university or college, **to be sent directly from the Department of Education or other institution maintaining such records.**

### Advanced Standing

Students from other universities may be admitted to advanced standing. Extramural credits from recognized universities may be accepted under certain conditions, but such credits will not be considered beyond the first year of

*This prescription applies also to students of other universities in Alberta who wish to transfer to The University of Alberta.

university work. Students who have taken the equivalent of university courses in some other manner may be given advanced placement (i.e. excused from taking such courses) but will not necessarily be granted advanced standing in them. They may be required to substitute other courses in order to complete a program of normal weight at this university.

All applications for such admission should be addressed to the Registrar well in advance of the beginning of the session. Each application will be dealt with on its merits. The University reserves the right to require applicants for advanced standing to write examinations at any level including that of matriculation.

The amount of advanced standing that may be granted is limited by the residence requirements of the University, which provide that a student proceeding towards a first degree will normally be required to attend at least one acadmic year as a full-time student.

**Visé Fees**

A fee of $5.00 is charged for the evaluation of educational documents issued in Canada but outside Alberta; for documents issued in other countries the maximum fee is $10.00. Students entering the Faculty of Graduate Studies are exempt from visé fees.

## REGISTRATION PROCEDURES

**A student is responsible for the completeness and accuracy of his registration. He is also responsible for any adjustments of registration made necessary by the results of supplemental examinations. Particular care should be exercised with regard to prerequisite courses. Registration in courses which directly conflict on the time table will be allowed only when the permission of the Faculty Council concerned has been secured.**

**Limitations on Registration**

1. One full-year course, or equivalent, is regarded as the normal load for students in the Summer Session. However, students with good academic records may be permitted by their Faculties to register to a maximum of two full-year courses or the equivalent. Decisions with respect to the quality of a student's academic record normally will be based on the equivalent of a year's university work completed previously.
2. There are, however, certain designated courses which may not be taken concurrently with other courses. This limitation, when it applies, is indicated immediately after the course description.
3. Under no circumstances will a student be permitted to register in more than the equivalent of two full-year courses in the Summer Session, or of one full-year course if he attends only one term of the session.
4. No student may offer for credit in any period of twelve consecutive months more than three full-year courses taken by a combination of Summer Session, Evening Credit Program or late afternoon classes, and extramural study.

**Course Selection**

Since many classes will be in session at the same time, students are urged to look carefully at the timetables displayed towards the end of this calendar before selecting their courses.

Students are also advised to give priority to the compulsory courses and the laboratory courses in their programs. By so doing, they will minimize registration difficulties that may arise at a later date because of timetable conflicts.

**Advance Registration**

Registration forms must be completed and returned in duplicate to the Registrar not later than April 30. These forms must be accompanied by a non-refundable registration fee of $10.00 in the case of graduate students, or by a non-refundable deposit on tuition fees of $10.00 in the case of undergraduates.

**Students, except those registered in the Faculty of Graduate Studies, whose registration forms are received, or postmarked, not later than April 1, will be granted a reduction in instruction fees of $5.00 per full-year course.**

Students whose registrations have been approved will receive from the Registrar a statement of fees and later (in June), class admission cards.

**Confirmation of Registration**

On the first day of lectures, Tuesday, July 2, all students attending classes in the First Term must confirm their advance registration by reporting their presence to registration clerks **anytime** from 9:00 a.m. to 11:00 a.m. and from 12:00 noon to 2:00 p.m. at the main entrances of **any one** of the following buildings: Arts Building, Education Building, Henry Marshall Tory Building, and Lecture Wing of the Physics-Computing Science and Chemistry Buildings. Special forms of this purpose will be mailed to students in June with their Class Admission Cards.

Students attempting to confirm their registration after the appointed time may be refused permission. If permission is granted, a late penalty fee of $3.00 plus $2.00 per day will be assessed.

**Change or Cancellation of Registration**

After confirming his registration, a student may not change from one course to another, abandon a course, or withdraw from the Summer Session without first obtaining permission from the Dean or Director of his faculty or school. This permission, in the form of a "Change of Registration" or "Withdrawal" slip, signed by the Dean or Director, must be presented to the Registrar before the change becomes official.

A student who abandons a course or withdraws from the Summer Session without completing the required forms will not be eligible for any refund for fees, nor for exemption from fees in the event that he had not paid them.

**Payment of Fees**

Upon payment of fees students will receive an identification card. Registration is incomplete until fees have been paid and is subject to cancellation unless payment has been made by the final date mentioned in the following regulations.

1. Fees should be remitted by cheque or money order payable at par to The University of Alberta—not to any officer of the University.
2. Fees are payable at the time of advance registration. If, for any reason, payment is deferred until after receipt of a fee assessment, fees together

with the fee assessment card should be sent direct to the Bursar, The University of Alberta, Edmonton.

3. The last date for the payment of fees by undergraduate students is June 5. A penalty fee of $5.00 will be charged on any payment made or postmarked subsequent to that date and must be added to any remittance mailed or delivered to the University. If payment in full has not been made by July 9, registration will be subject to cancellation, and the student to exclusion from classes. There is no provision for partial payments.
4. The last date for the payment of fees by graduate students is June 5 or fifteen days after the date of assessment, whichever is the later. A penalty of $5.00 will be charged on any payments made or postmarked subsequent to that date.
5. In case of non-attendance all fees paid, except the registration fee or the $10.00 deposit on tuition fees, will be refunded upon application to the Registrar.
6. If notice of cancellation of registration is received by the Registrar by July 9, all fees except the $10.00 graduate registration fee or $10.00 undergraduate deposit will be refunded. If notice is received subsequent to July 9 a *pro rata* charge from July 2 will be made and the balance refunded except that no refunds will be made where withdrawal or cancellation is subsequent to August 6.

## FEE SCHEDULE

**NOTE—These fees are subject to change without notice**

### Undergraduate Programs

**General Fees**

| | |
|---|---|
| Students' Union: General | $ 1.00 |
| Building | 4.00 |
| | $ 5.00 |

**Instruction Fees**

| | |
|---|---|
| Per full course | *$100.00 |
| Per half course | ** 50.00 |
| Auditor's fee, per full course | 12.00 |
| Auditor's fee, per half course | 6.00 |

### Graduate Programs

**General Fees**

| | |
|---|---|
| Registration | $ 10.00 |
| Students' Union: General | 1.00 |
| Building Fund | 4.00 |
| | $ 15.00 |

**Instruction Fees**

| | |
|---|---|
| Students registered for the M.Ed. degree and who obtain residence credit at Summer Session (Applicable only to students on program before September, 1962 and to graduate students in Industrial and Vocational Education) | $195.00 |

*$95.00 if advance registration is completed by April 1.

**$47.50 if advance registration is completed by April 1.

All graduate students who have paid the basic degree program fee in full, for each additional registration in a Summer Session ..... $ 40.00

All other graduate students (per full course) ..... $100.00

Students who register for Summer Session will, without registering for the winter session, be entitled to: (a) receive thesis direction from the division or department and use the library for twelve months, and (b) graduate at Fall or Spring Convocation.

## PRE-SESSION STUDY

In view of the brevity of the Summer Session, it is expected that students will have mastered a substantial portion of the content of their courses prior to the opening of the session.

**Study Outlines**

Study outlines giving direction for preparatory work in each course will be sent to students as soon as, but not before, their registrations have been approved.

**Textbooks**

Titles of textbooks will be included in the study outlines. Students may obtain their textbooks from the University Bookstore at Edmonton. Mail orders will be accepted only on a C.O.D. basis.

Students are advised to order textbooks immediately after receiving study outlines. Failure to do so may result in their being unable to obtain prompt delivery at a later date due to books being temporarily out of stock.

**Preliminary Examinations**

Examinations on the prescribed preparatory study will be held during the first week of classes. If preparation proves to be inadequate, a student may be asked to withdraw from the course. The requirement makes it all the more necessary that registration be completed at an early date, textbooks secured, study commenced, and work carried forward consistently.

## ATTENDANCE

1. Regular attendance is expected of students in all courses. At the recommendation of the Department concerned, and with the concurrence of his Dean, any student having an inordinate number of unexcused absences from a course may be refused permission to take the final examination.
2. Absences are counted from the first day of the session.
3. Students who are late for a lecture or laboratory period will be marked absent unless at the end of the period in question they account satisfactorily to the instructor for their lateness.
4. Illness and Physical Disability:
   (a) Students who are absent from two or more consecutive classes in a course because of illness or disability should report the reason to the instructor upon their return.
   (b) Absence from term or final examinations. See items 6 and 7 of the next section (Examinations).
5. Students who are absent from two or more consecutive classes in a course for some valid reason other than illness should report to the instructor

upon their return. If the instructor requires an absence slip, it will be the student's responsibility to have one signed by the Registrar, and show it to the instructor.

6. Students desiring leave of absence in a given course must apply to the Registrar. At the end of such period of absence, the student must present an absence slip for the Registrar's signature.

## EXAMINATIONS

1. **Final Examinations.** Final examinations in courses terminating at the end of the first term will be conducted on Tuesday, July 23. For courses terminating at the end of the second term, final examinations will commence on Wednesday, August 14. Examination timetables are displayed towards the end of this calendar.
2. **Distribution of Credits.** In each course where a final examination is held credit of not less than 30% and not more than 70% will be assigned to term work. The remaining credit in each course will be assigned to the final examination.
3. **Grading System.** The following nine-point grading system is in effect:

| | |
|---|---|
| 9 | |
| 8 | Excellent |
| 7 | |
| 6 | Good |
| 5 | |
| 4 | Pass |
| 3* | |
| 2 | Fail |
| 1 | |

4. **Passing Grades.** For students proceeding towards an undergraduate degree the minimum passing grade is 4 unless otherwise specified; in courses taken towards a graduate degree the minimum passing grade is 6.
5. **Debarment from Final Examination.** A student may be refused permission to write a final examination in a course on the recommendation of the department concerned and with the concurrence of the Dean of his faculty in the following circumstances:
   (a) The student has an inordinate number of unexcused absences.
   (b) The student has neglected to do a substantial proportion of his written assignments in a course of which they are an essential feature.
   (c) The student has neglected to do a substantial proportion of the laboratory work in a science course.
6. **Absence from Term Examinations or Tests.** If a student has an unexcused absence from a term examination or test, the grade assigned to him will be zero. However, in case of illness the student may be excused from writing the examination or test. In applying for exemption a student must

*A grade of 3 in an individual course may be accepted by a Faculty if warranted by the student's over-all academic record.

present to his instructor an absence slip signed by a physician. When exemption is granted the percentage allotted to the examination or test missed will be added to the percentage allotted to the final examination.

7. **Absence from Final Examinations.** Any student who is ill or suffering from severe domestic affliction is advised not to sit for a final examination. Instead he should advise the Registrar at once of the circumstances and should apply for a deferred final. (See item 8 below.)

   If a student becomes ill or receives word of domestic affliction during the course of an examination, he should report at once to the Supervisor, hand in his unfinished paper and request that it be cancelled. Thereafter, if illness is the cause, he must go directly to the Infirmary so that any subsequent application for a deferred examination may be supported by a medical certificate. The Registrar should be notified of the circumstances in writing within forty-eight hours of the examination.

   **Should a student write an examination, hand in his paper for marking, and later report extenuating circumstances to support his request for cancellation of his paper and for another examination, such request will not be entertained.**

8. **Deferred Final Examinations.** A student who has missed a final examination because of illness or domestic affliction or who is obliged to absent himself from an examination for some other compelling reason (including religious convictions) may apply for a deferred final examination. Deferred examinations normally will be written during one of the regularly scheduled examination periods. All applications for deferred examinations will be referred to the student's Dean or Director for a final decision.

9. **Statement of Record.** After the Summer Session a statement of record will be mailed to each student at the home address indicated on his registration form.

10. **Reappraisal of Final Examination Papers.** Since great care is taken in the marking a final examination papers, a student should apply for reappraisal of a paper only if he has good reason to believe that a mistake has been made. Reappraisals are dealt with by the head of the department in consultation with members of the staff. A request for reappraisal must be made by letter to the Registrar within thirty days after the publication of results, accompanied by a fee of $10.00 for each paper. The fee will be refunded if the grade is raised. It should be understood that if the grade is changed, the new grade, whether higher or lower than the original, replaces it as the student's official grade in the course.

11. **Supplemental Examinations.** Supplemental examinations are not granted to students in the Summer Session.

12. **Examination Fees.**
    (a) **Final Examinations:** No fee is levied for final examination written during the regular examination periods.

    (b) **Deferred Final Examinations:** A fee of $5.00 is charged for each deferred final written during regular examination periods. The fee for special

deferred finals requiring the setting of special papers is $40.00 per paper.*

(c) **Outside Centres:** An additional fee of $5.00 per subject is charged for writing deferred final examinations in established Alberta centres other than Edmonton.

## LIVING ACCOMMODATION

### Residences

Approximately 1200 students can be accommodated in the residence halls during the Summer Session. Only persons registered at The University of Alberta or persons affiliated with the University may live in residence.

Application forms are obtainable from the Housing Office. To reserve accommodation in residence a completed application form accompanied by $15.00 advance payment is necessary. This advance payment is credited towards the contract. Application forms together with the deposit should be mailed to the Director of Housing and Food Services, Lister Hall, The University of Alberta, Edmonton.

The contract rate for the full session from July 2 to August 14 is $1.25 per day for a double occupancy of a furnished room and $1.75 per day for a single occupancy of a furnished room. Reservations will not be held beyond 10:00 a.m. on July 2, unless prior arrangements have been made with the Housing Office.

If an applicant cancels a reservation prior to June 15, the full payment will be refunded. No refund will be made after that date. Cancellations should be in writing and be post marked not later than June 15.

Jurisdiction over the conduct of the students in the University residences during the Summer Session is vested in the Provost, Resident Deans and the House Committees, authorized by the Deans' Council for that purpose.

A limited amount of accommodation is available in St. Stephen's College and St. Joseph's College. Details can be secured by writing to the Colleges directly.

### Food Services

During the Summer Session food services will be available at Lister Hall, and at the New Students' Union Building on an a la carte basis.

### Married Students' Housing

A limited number of furnished units in the married students' housing complex at Michener Park may also be available on a sub-lease basis for married students who prefer such facilities. These units consist of a living room, dinette, kitchen, bathroom and two bedrooms. Each unit has an electric stove, refrigerator, washer and dryer. A listing of available units will be held by the Housing Office and information will be given on request. Any sub-lease contract will be between the present lessee and the summer student. No direct assignment of these units will be made by the Housing Office.

*Where the student has been prevented by illness or other extreme circumstance from writing at the regular time, a portion of the fee may be waived.

## STUDENT COUNSELLING SERVICES

The University provides a counselling service available throughout the year to all University students and prospective students.

1. **Prospective Students.** A bulletin, "Information for Prospective University students', has been prepared to answer the questions commonly asked. Interviews can be arranged at any time prior to the opening of the Summer Session.
2. **Counselling Services.** Students may make use of the service in regard to studies, vocational choice, personal and financial problems.
3. **Change of Faculty.** Students contemplating a change of school or faculty are advised to consult a counsellor. This should be done well before the opening of the session.
4. **Withdrawal from the University.** Any student who for any reason is contemplating withdrawal from the University should arrange an interview with a counsellor and subsequently with his Dean or Director.

## STUDENT HEALTH SERVICES

A Student Health Service Fund is maintained by an annual appropriation from revenue. This fund provides for treatment of minor ailments only and cannot be expected to take care of prolonged or otherwise costly illness.

Students are urged to be in possession of the telephone number of the Infirmary (439-4991) and of the consulting hours of the Infirmary Physician. In cases of illness or emergency the nurse in charge should be called without delay.

## TEACHER PLACEMENT SERVICE

The National Employment Service, which maintains an office on Campus, is prepared to assist teachers who are seeking employment with school boards. The service has listings of teacher requirements from school boards throughout the whole Province. Summer Session students are urged to register with N.E.S. on arrival so that interviewing schedules may be set up with visiting boards.

## FINANCIAL ASSISTANCE AND AWARDS

### Financial Assistance

Undergraduate students enrolled in Summer Session may apply for a loan up to $250, based on financial need. Applicants must:

(1) have been enrolled for at least one academic year as a full-time student in a recognized university, and

(2) be enrolled in the Summer Session in one or more courses leading towards the degree for which they are registered.

Applications for financial assistance must be made not later than July 15 on forms obtainable from The Secretary, Students' Assistance Board, Department of Education, Edmonton.

### Summer Session Students' Union Prizes

Four prizes of $100 each are offered annually to students graduating from The University of Alberta, Edmonton, with a Bachelor's degree for which the final requirements were completed in a Summer Session. The awards are made to those with the highest averages on the last five full-year courses (or equivalent) taken in Summer Sessions at The University of Alberta and counted towards the degree, provided that the grade-point average is not less than 7.0.

## FALL CONVOCATION, 1968

Summer Session students who expect to qualify for a degree to be conferred at the Fall Convocation, 1968, should note carefully that announcements regarding the Convocation will be sent to their homes or permanent addresses as reported on their Application for Degree forms. It is the responsibility of these students to advise the Registrar of changes in their addresses.

# THE FACULTY OF ARTS

In the Summer Session the Faculty of Arts offers courses acceptable for credit in the general program leading to the degree of Bachelor of Arts (B.A.).

**Students who are planning to begin work in the Faculty of Arts in the 1968 Summer Session should contact the office of the Dean before registering.**

## THE GENERAL PROGRAM

**Course Requirements for the B.A.**

**First Year**

English 200; an Arts course; a laboratory Science course; two options; Physical Education.

**Second Year**

An Arts course; a Natural Science course; three options.

**Third Year**

An Arts course; four options.

**Notes:**

1. Each student must include in his program a minimum of three courses and a maximum of five in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration.
2. There may not be more than seven junior courses in the program, except by special permission of the Dean.
3. A student registering for the B.A. degree must choose his principal subject of concentration in the humanities or in the social sciences, or in mathematics.
4. To be awarded the B.A., the student must present credit in at least eight courses in the humanities and social sciences.

**Graduation Requirement**

To be granted the B.A. degree, a student must present passing grades (4 or better) in a minimum of fourteen full courses, not less than 3 in a fifteenth full course, and a grade point average of at least 5.0 in all courses credited to the degree after the first year.

## B.A. AFTER B.ED.

Holders of the B.Ed. degree, whose programs include thirteen Arts and Science courses, may qualify for the B.A. degree by completing a six-course program as prescribed by the Faculty of Arts. Those with fewer than thirteen Arts and Science courses will be required to take additional courses.

## B.A. AFTER B.SC.

Students who have qualified for the degree of B.Sc. may proceed to the degree of B.A. by completing a nine-course program as prescribed by the Faculty of Arts.

# THE FACULTY OF SCIENCE

In the Summer Session the Faculty of Science offers courses acceptable for credit in the general program leading to the degree of Bachelor of Science (B.Sc.).

**Students who are planning to begin work in the Faculty of Science in the 1968 Summer Session should contact the office of the Dean before registering.**

## THE GENERAL PROGRAM

**Course Requirements for the B.Sc.**

**First Year**

English 200 or 210; an Arts course; a Science course; two options; Physical Education.

**Second Year**

An Arts course; a Science course; three options.

**Third Year**

An Arts course; a Science course; three options.

**Notes:**

1. Each student must include in his program a minimum of three courses and a maximum of five in a principal subject of concentration, and a minimum of three and a maximum of four in a second subject of concentration.
2. There may not be more than seven junior courses in the program, except by special permission of the Dean.
3. A student registering for the B.Sc. degree must choose his principal subject of concentration in the physical or biological sciences. To be awarded the B.Sc., the student must pass at least eight science courses. Not more than eleven science courses may be credited towards the degree.

**Graduation Requirements**

To be granted the B.Sc. degree, a student must present passing grades (4 or better) in a minimum of fourteen full courses, not less than 3 in a fifteenth full course, and a grade point average of at least 5.0 in all courses credited towards the degree after the first year.

## B.SC. AFTER B.ED.

Holders of the B.Ed. degree, whose programs include thirteen Arts and Science courses, may qualify for the B.Sc. degree by completing a six-course program and attaining a grade point average of 5.0 in these courses, as prescribed by the Faculty of Science. Those with fewer than thirteen Arts and Science courses will be required to take additional courses.

## B.SC. AFTER B.A.

Students who have qualified for the degree of B.A. may proceed to the degree of B.Sc. by completing a 9-course program as prescribed by the Faculty of Science.

# THE FACULTY OF EDUCATION

The Faculty of Education is organized for the professional education of teachers for elementary and secondary schools and for graduate study and research in the field of Education.

## GENERAL INFORMATION

**Summer Session Programs**

In the Summer Session, the Faculty of Education in association with other Faculties and Schools offers courses appropriate to the following programs:

1. B.Ed. Program—Elementary Route
2. B.Ed. Program—Secondary Route
3. B.Ed. Program in Industrial Arts
4. B.Ed. Program in Vocational Education—Route 1 only
5. B.Ed. Programs for Holders of Approved Degrees
6. Advanced Study in Education

These programs are described in detail in the sections that follow.

**Advanced Standing for Certificated Teachers**

Certificated teachers who have had a year of teacher education and who have clear matriculation into the Faculty of Education will be given a year of advanced standing on the four-year B.Ed. program.

**The granting of advanced standing for courses taken in the former Alberta Department of Education summer sessions was discontinued June 1, 1965.**

**Basic Graduation Requirements** (Applicable to Summer Session students registered in programs 1-4 above)

1. To be recommended for the first certificate a student must obtain a grade point average of at least 4.6.
2. A grade of 3 or above is required for credit on the B.Ed. program, but, normally, not more than two grades of 3 may be credited on the four-year program. To be granted the B.Ed. degree a student must obtain a grade point average of at least 5.0 in all courses credited on the last three years of the degree program.
3. The privilege of repeating a failed course will not be granted more than once.
4. The maximum number of additional courses, including repeated courses, in which a student may enrol for the completion of a B.Ed. degree program may not exceed by more than five the number of courses required for completion of the particular B.Ed. degree program.

**To meet graduation requirements after November, 1966, students will be placed on the nine-point grading system and will meet the regulations mentioned above under Basic Graduation Requirements.**

**Certification of Out-of-Province Teachers**

Teachers holding certificates not issued by the Province of Alberta should apply directly to the Registrar, Department of Education, Administration Building, Edmonton, for an equivalent Alberta teaching certificate.

One requirement for making such certificates permanent in Alberta may be

the successful completion of two courses at a Summer Session. The Registrar, Department of Education, will decide whether this is required. When such courses are prescribed they should be chosen in consultation with the Faculty of Education.

It is important that candidates who wish these courses to count for degree credit as well as for certification consult with the Faculty to make sure that they apply on a degree program. Candidates with the B.A. or similar degree may wish to begin the B.Ed. program for holders of approved degrees as mentioned above. Those with the B.Ed. degree who may wish to be considered for the M.Ed. program should elect education courses numbered over 500.

## THE STANDARD ELEMENTARY B.ED. PROGRAM

Upon completion of the first two years, candidates are eligible for the Interim Standard E Certificate, valid in Grades I to IX; completion of three years earns the Interim Professional Certificate, valid in Grade I to XII; completion of four years, the B.Ed. degree.

### Degree Program for Certificated Teachers

**First Year**

Credit granted on the basis of at least seven months of teacher education.

**Second Year**

1. English 200 or 210
2. Major
3. Major
4. Arts or Science option
5. Arts or Science option
5. Senior Education option

**Third Year**

1. Educational Psychology 471 and one additional half-year course in Educational Psychology at the 400 level.
2. Philosophy 240 or 242
3. Major

*4. Approved Social Science or History option

†5. Approved Arts or Science or Senior Education option

**Fourth Year**

1. Educational Foundations 492 or 496
2. Major
3. Arts or Science option

†4. Senior Education option

†5. Senior Arts or Science or Education option

**Notes on the Program:**

*1. The following courses, which are being offered in the 1968 Summer Session, may be presented as approved options under item 4 of the program for the third year:
Anthropology 202, Economics 200, History 200 and 370, Geography 201, Political Science 200, Sociology 202.

†2. Only two senior Education options may be included in the third and fourth years of the program.

3. Graduation Requirements: The basic requirements as listed above.

**Elementary Route Major Fields**

Candidates must select a major field of study. Courses are to be chosen according to the patterns listed below:

**I. Art**

1. Art 230
2. Art 240
3. Senior Art
4. Ed CI 410

**II. English**

*1. English language or linguistics
2. A course in English literature
3. Any senior English or Linguistics
4. Two of: Ed CI 417, 419 or 421, 437, 439

**III. Early Childhood Education**

1. }
2. } Three of: Art 200 or 230; Drama 240 or 250; English 398; Music 213
3. } or 210; Physical Education 202
4. Ed CI 426

**IV. French**

1. French 201
2. French 330
3. Approved senior French
4. Ed CI 331, and 333 or 335

**V. Mathematics**

1. Mathematics 274
2. Mathematics 374
3. Mathematics 242
4. Ed CI 427 and 429

**VI. Music**

1. Music 213
2. Music 202
3. Two approved half courses in music or one of Music 250 or 302
4. Ed CI 414

**VII. Physical Education**

1. Physical Education 202
2. Physical Education 325 and 327
3. Physical Education 422
4. Physical Education 419 and 429

**VIII. Science**

1. }
2. } Three science courses of which at least two are laboratory courses
3. } from different fields.
4. Ed CI 431 and 433

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*An Arts or Science option may be taken in the first year in lieu of a course in the major.

**IX. Social Studies**

*1. A basic (200 level) course in social science or history
*2. } Two senior courses in the field chosen as a major
*3. }
4. Ed CI 405 and 407

**Use of Options**

Students should give careful consideration to the various opportunities provided by the Arts or Science option, the Education option, and the Senior Arts or Science or Education option in the Elementary Route propram. These may be regarded as "free" options and used to explore a variety of fields; or they may be patterned in such a way as to provide some preparation for certain functions related to teaching in the elementary school.

The following are illustrative of the ways in which these courses may be patterned:

1. **Elementary School Libraries**
   Ed CI 345 and 347
   Ed CI 446
   English 398 or an approved Arts option
2. **Education of Exceptional Children in the Elementary School**
   See Program in Special Education, under Use of Options, Secondary Route.
3. **Early Childhood Education**
   Ed CI 420
   Ed CI 426
   An approved Arts or Science option
4. **Speech Education**
   Ed CI 341 and 343
   Two approved related options
5. **Reading**
   English language or linguistics
   English 398
   Ed CI 417 and one of Ed CI 419 or 421
6. **Second Language Instruction**
   Linguistics 370
   Linguistics 389
   Ed CI 331 and 333 or Ed CI 337 and 339
7. **Language**
   Two of: Linguistics 305, Linguistics 389, English 398
   Two of: Ed CI 345, 347, 341, 417 or Ed CI 437 and 439.
8. **Further Study in the Major Field**
   Two Arts or Science courses in major field
   One supporting Education option

**Students are urged to plan the patterning of these courses in consultation with the Dean or the Department Head.**

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*The courses of the major must be in a field **other** than that selected as a social science or history option in the third year.

### Program in Intercultural Education

**Course requirements**

Year III—Sociology 202 or 403 or Anthropology 302 or 305 (in lieu of approved social science or history option)
—Approved linguistics (in lieu of approved arts or science option)
Year IV—Ed Fdn 416 (Anthropology 416) (in lieu of senior arts, science, or education option)
—Ed CI 337 and 339

**Practicums**

A minimum of two practicums (or equivalent experience) selected from among the following:

Before the **beginning** of Year III—standard pre-employment practicum and/or experience in community development in a non-teaching situation
At **end** of Year III —practicum in an intercultural situation
At **end** of Year IV —pre-employment practicum

Those interested in this program are urged to consult with the Head of the Department of Elementary Education.

## THE STANDARD SECONDARY B.ED. PROGRAM

Upon completion of the first two years, candidates are elgiible for the Interim Standard S Certificate, valid in Grade IV to XI; completion of three years earns the Interim Professional Certificate, valid in Grades I to XII; completion of four years, the B.Ed. degree.

### Degree Program for Certificated Teachers

**First Year**

Credit granted on the basis of at least seven months of teacher education.

**Second Year**

1. Major
2. Major
3. Curriculum and Instruction (major field)
4. English 200 or 210 (English majors must elect English 200)
5. Approved Arts option in social science or history
6. Major
7. Major or Arts or Science option

**Third Year**

1. Educational Psychology 471 and one additional half course in Educational Psychology at the 400 level.
2. Philosophy 240 or 242
3. Major
4. Major or Arts or Science option
5. Senior Education option

**Fourth Year**

1. Educational Foundations 492 or 496
2. Major
3. Senior Education option
4. Major or Arts or Science option
5. Major or Arts or Science option

**Notes on the Program:**

1. At least three courses in the major field must be completed by the end of the second year.
2. Graduation requirements: As listed above.

**Secondary Route Major Fields**

Each candidate must select a major field of study. Courses are to be chosen according to the patterns listed below.

| Major Field | Supporting Courses | Prescribed Core |
|---|---|---|
| **I. English** | 1. English 288<br>2. Three of English 332, 356, 364, 373, 380, 383,<br>3. 384, 388, 392, 393, 396,<br>4. or Linguistics 389<br>5. Any senior English course, Linguistics 389, or Drama 240 | 6. Any two senior<br>7. English courses<br>or<br>Two approved courses in history, foreign language, the fine arts, classics, or linguistics |
| **II. French** | 1. French 201<br>2. French 330<br>3. French 340<br>4. Linguistics 370<br>5. French 350 | 6. Two senior courses<br>7. in French<br>or<br>Two approved options |
| **III. German** | 1. German 200<br>2. German 330<br>3. German 350<br>4. Two senior German<br>5. courses | 6. Two approved<br>7. options |
| **IV. Latin** | 1. Latin 200<br>2. Latin 300<br>3. Latin 373<br>4. Latin 374<br>5. Latin 375 | 6. Two approved<br>7. options |
| **V. Slavonic Languages** | 1. Russian 100 or Ukrainian 200<br>2. Russian 300 or Ukrainian 330<br>3. Russian 374 or Ukrainian 420<br>4. Russian 390 or Ukrainian 390<br>5. One of: Russian 360, 400 Ukrainian 360, 400 | 6. Two senior courses in<br>7. Slavonic Languages or approved options |

| Major Field | Prescribed Core | Supporting Courses |
|---|---|---|
| **VI. Social Studies** | 1. History 200<br>2. History 370<br>3. Geography 201<br>4. Geography 300 | 5. } Two approved courses<br>6. } in social science or history, one of which must be in a field other than history or geography<br>7. Approved senior social science or history course |
| **VII. Mathematics** | 1. Mathematics 274<br>2. Math. 201 or 207 or 180<br>3. Mathematics 374<br>4. Approved senior mathematics<br>5. Statistics 255 | 6. } Two senior mathematics<br>7. } courses<br>or<br>Two approved courses in a related field |
| **VIII. Biological Sciences*** | 1. Biology 130<br>2. 230<br>3. Approved senior zoology<br>4. } Chemistry 230<br>5. } Chemistry 350<br>or<br>Chemistry 250 and Approved senior zoology, botany, entomology, or genetics | 6. Approved senior botany course<br>7. Approved senior course in biology, biochemistry, entomology or gentics |
| **IX. Physical Sciences*** | 1. Chemistry 230<br>2. Math. 207 or 201 or 220<br>3. Physics 200 or 240<br>4. Chemistry 350<br>5. Approved senior physics course | 6. Approved senior physics or chemistry course<br>7. Approved course in chemistry, physics, geology, astronomy, meteorology or physical geography |
| **X. Art** | 1. Art 230<br>2. Art 240<br>3. Art 401<br>4. } Two of: Art 300, 310,<br>} 320, 330, 340, 350, 361,<br>5. } 400, or Phil 350 | 6. } Two approved options<br>7. } in a related field |

*Students who enter this program with credit in Biology 30 (or equivalent) are not required to take Biology 130. Instead, they will move directly to the second course on the major pattern and take an **approved botany course** to complete the prescribed core.

*Careful attention should be given to the mathematics prerequisites or corequisites for physics courses.

| Major Field | Prescribed Core | Supporting Courses |
|---|---|---|
| **XI. Music** | 1. Music 213<br>2. Music 304<br>3. Music 311<br>4. } Music 202, 250, 302, 402<br>5. } or 404 | 6. } Any two of the courses<br>7. } listed under 4 and 5 or Music 350 or Philosophy 350 or two approved options in a related field |
| **XII. Drama** | 1. Drama 250<br>2. Drama 240<br>3. Drama 270<br>4. Drama 480<br>5. Drama 300 or 400 | 6. } Two senior drama<br>7. } courses<br>or<br>Two approved options in a related field |
| **XIII. Household Economics** | 1. Chemistry 250<br>2. H.Ec. 201 and 221<br>*3. H.Ec. 203 and 307<br>4. H.Ec. 321 and 325<br>5. H.Ec. 303 and 355 | 6. H.Ec. 350<br>7. Approved household economics option<br>or<br>An approved option in a related field |
| **XIV. Business Education**<br>**(a) Secretarial** | 1. Ed Bus 341 and 343<br>2. Accounting 202 and 204<br>3. Two of: Ed Bus 351, 353, 355<br>4. Bus 202, 250 or 300<br>5. Bus Law 310 | 6. } Two approved options<br>7. } in a related field |
| **(b) Accounting-Clerical** | 1. Ed Bus 341 and 353<br>2. Accounting 202 and 204<br>3. Ed Bus 351 and 355<br>4. Bus 202, 250 or 300<br>5. Bus Law 310 | 6. } Two approved option s<br>7. } in a related field |
| **XV. Physical Education** | 1. Physical Education 236<br>2. Physical Education 336<br>3. Physical Education 436<br>4. Physical Education 391 and 441 | 5. Physiology 260<br>6. } Two approved options<br>7. } in related field |

*Students given advance placement may substitute H.Ec. 205 and 309 for H.Ec. 203 and 307.

### Use of Options

Students should give careful consideration to the various opportunities provided by the two Arts/Science Options and the two Education Options in the Secondary B.Ed. program. These may be regarded as "free" options and used to explore a variety of fields; or they may be patterned in such a way as to provide some preparation for certain functions related to teaching in the Secondary School.

The following are illustrative of the ways in which these courses may be patterned:

1. **Further Specialization in Educational Psychology**
   - Four of: Ed Psy 411, 421, 473, 475, 487, 489 and
   - Two of: Soc. 361, Psyco 353 and Psyco 383; or Stat 255 and
   - Two of: Soc. 341, Soc. 343 or Psyco 337

2. **Further Specialization in Teaching Field**
   - Two Arts or Science courses in the major field
   - One advanced Curriculum and Instruction course
   - One supporting Education option

3. **Physical Education in the Secondary School**
   - Physical Education 232 and 332
   - Ed CI 498
   - A related Education option

4. **Teaching in the Junior High School**
   - Two Arts or Science options (selected to give breadth)
   - Two Education options

5. **Library Services in the Secondary School**
   - Ed CI 345 and 347, Ed CI 446, English 398 or an Arts option, and
   - a selected Arts or Science option

6. **Speech Education**
   - Ed CI 341
   - Ed CI 353

7. **Intercultural Education**

   (See program under Elementary Education)

8. **Reading in the Junior and Senior High School**
   - Ed CI 417 and either Ed CI 451 or 455
   - A course in Linguistics or English Language
   - One of: English 393; Phil 250, 440, 462

9. **Program in Special Education**

   (Psychology and Education of Exceptional Children)

   Within the Elementary and Secondary routes of the B.Ed. program students may secure varying levels of preparation in the field of Special Education. The possibilities and opportunities for undergraduate preparation to teach exceptional children are indicated below. Subject to the requirements for completing the teaching major (English, Early

Childhood Education, Household Economics, etc.) and for graduation, following are suggestions for patterning a program in Special Education at the undergraduate level:

| Elementary Route | Secondary Route |
|---|---|
| **Year I** | |
| Ed Psy 269 and Ed Psy 349 | Ed Psy 269 and Ed Psy 349 |
| **Year II** | |
| Ed Psy 471 and one half course in Special Education.<br>One full or two approved half courses related to Special Education. | Approved Arts or Science option related to Special Education. |
| **Year III** | |
| Two half courses in Special Education (Ed CI 200 to be taken in this year). | Ed Psy 471 and three half courses in Special Education. |
| **Year IV** | |
| Two half courses in Special Education.<br>One full or two approved half courses related to Special Education. | 1. Two half courses in Special Education.<br>2. Approved Arts or Science option related to Special Education. |

**General Notes:**

Students who are interested, or who wish preparation in Special Education should:

1. Consult with the Department of Elementary Education (or the Department of Secondary Education) and the Department of Educational Psychology for guidance in program planning.
2. Refer to the Educational Psychology section of the Education Calendar for details on Special Education courses, namely: Ed Psy 349, 351, 355, 357 and 359, as well as Ed Psy 451, 453, 455, 457 and 459.
3. Secure information from any of the above-mentioned departments regarding approved options related to Special Education.

**Students are urged to plan the patterning of these courses in consultation with the Dean or the Department Head.**

## THE B.ED. IN INDUSTRIAL ARTS

The following program has been designed to meet the needs of teachers of Industrial Arts. It is available only at Edmonton. Teachers already embarked on other B.Ed. programs may transfer to this program on consultation with the Dean.

### Degree Program for Certificated Teachers

**Second Year**

1. Ed IA 203
2. English 200 or 210
3. Approved mathematics course
4. Ed IA 260

5. Approved chemistry course
6. Approved physics course
7. Ed IA 270

**Third Year**

1. Educational Psychology 471 and one additional half course in Educational Psychology at the 400 level.
2. Philosophy 240 or 242
3. Approved Arts or Science option
4. Ed IA 360
5. Ed IA 370

**Fourth Year**

1. Educational Foundations 492 or 496
2. Approved social science course
3. Ed IA 350
4. Ed IA 460
5. Ed IA 470

**Graduation requirements:** As listed above.

## THE B.ED. IN VOCATIONAL EDUCATION—ROUTE I

**First Year**

1. Trade training as verified by a recognized Certificate of Qualification as a Journeyman for a designated trade or equivalent for a non-designated trade.
2. Experience in a trade or industry calling for the trade training held by the candidate.

**Second Year**

1. Educational Foundations 201
2. Educational Administration 261
3. Ed Voc 204
4. Educational Psychology 269 and 271
5. English 210
6. Ed Voc 279 and 281
7. Ed CI 250

**Third Year**

1. Educational Psychology 471 and one additional half course in Educational Psychology of the 400 level.
2. Philosophy 240 or 242
3. Ed Voc 350
4. Junior Arts or Science option
5. Junior Arts or Science option

**Fourth Year**

1. Educational Foundations 492 or 496
2. Ed Voc option
3. Senior Arts or Science option
4. Senior Arts or Science option
5. Senior Arts or Science option

**Notes on the Program:**

1. One Arts or Science sequence to be directly related to vocational education.
2. One Arts or Science sequence required to provide an element of general education.
3. Graduation requirements: As listed above.

## B.ED. PROGRAMS FOR HOLDERS OF APPROVED DEGREES

### General Requirements

(Applicable to all programs)

1. Students following these programs are required to complete one year of intramural attendance as full-time students before they will be recommended for a teaching certificate.
2. Students entering these programs lacking credit in the prerequisites for Ed. Psy. 469-471 or Ed. Fdn. 492 or 496 or both will be required to remove deficiencies. Such students, however, will be permitted to register in a six-course program leading to the Standard E or S Certificate. With five additional courses they can qualify for the B.Ed. degree. For further details consult the Education Calendar.
3. The holder of an approved Honors or Masters degree may qualify for the B.Ed. degree by completing the first eight of the required courses and meeting the graduation requirements.
4. **Graduation Requirements:**
   (a) A grade of 3.0 in each course and a grade point average of at least 5.0 on all courses credited on the degree program. A grade of 3.0 in only one course will be credited on the two year B.Ed. program. (Those who transfer to the B.Ed. program with advanced standing will be required to maintain a grade point average of at least 5.0 on all courses completed at The University of Alberta toward the B.Ed. degree.)
   (b) A student will not be allowed to write more than two supplemental examinations in the total program for the purpose of obtaining a grade of 4 in a course or raising his grade point average to 5.0.

### Program for Teachers in the Elementary School

**First Year**

1. Ed Adm 462
2. Ed Psy 469 and 471
3. Ed CI 400
4. Ed Fdn 492 or 496
5. Ed CI 402
6. Ed CI 404

(Satisfactory completion of these six courses permits the student to obtain the Interim Professional Certificate)

**Second Year**

(7-11) Five approved courses of which at least two must be in Education and at least two in Arts or Science.

(Satisfactory completion of all eleven courses permits the student to apply for the B.Ed. degree)

**Notes on the Program:**

1. Students who present a degree which does not contain the equivalent of a major as required in the regular elementary route B.Ed. will be required to make up the deficiency before proceeding with this program. A maximum of two courses taken for this purpose may be credited toward the degree.
2. Certificated Candidates (Jr. E. or equivalent) will complete items 2 and 4 for the Professional Certificate. To obtain the B.Ed. degree, such candidates will present, in addition, items 7 to 11 (inclusive) of the program.
3. Provision can be made in the program for specialization in subject fields, early childhood education, reading, education of exceptional children, intercultural education, school libraries, and the like.
4. Students interested in qualifying for a Masters degree or Graduate Diploma rather than for the B.Ed., following the Professional Certificate year, should consult the appropriate department regarding requirements.

**Program for Teachers in the Secondary School**

**First Year**

1. Ed Adm 462
2. Ed Psy 469 and 471
3. Ed CI 450
4. Ed Fdn 492 or 496
5. Education: Curriculum and Instruction (major field)
6. Ed Fdn 414 or Ed Psy 487 and 489.

(Satisfactory completion of these six courses permits the student to obtain the Interim Professional Certificate)

**Second Year**

(7-11) Five approved courses of which at least two must be in Education and at least two in Arts or Science.

(Satisfactory completion of all eleven courses permits the student to apply for the B.Ed. degree)

**Notes on the Program:**

1. Students who present a degree which does not contain the equivalent of a major as required in the regular secondary route B.Ed. will be required to make up the deficiency before proceeding with this program. A maximum of two courses taken for this purpose may be credited toward the degree.
2. Holders of the B.Com. degree wishing to enter the business education program must have credit in Typewriting 10 of the high school or its equivalent. Students who are deficient in this respect should remove the deficiency by registering in Ed. Bus. 246 in the summer session prior to enrolling in the winter session.
3. Certificated Candidates (Jr. E. or equivalent) will complete items 2, 4 and 5 above for the Professional Certificate. To obtain the B.Ed. degree, such candidates will present, in addition, items 7 to 11 (inclusive) of the program.
4. Provision can be made in the program for further specialization in

subject fields, guidance and counselling, library services, intercultural education, and the like.

5. Students interested in qualifying for a Masters degree or Graduate Diploma rather than for the B.Ed., following the Professional Certificate year, should consult the appropriate department regarding requirements.

### Program for Vocational Education Teachers

**First Year**

1. Ed Adm 462
2. Ed Psy 471 and one additional half course in Educational Psychology at the 400 level
3. Ed Voc 479 and 481
4. Ed CI 450
5. Ed Fdn 492 or 496
6. Ed Voc 404

(Satisfactory completion of these six courses permits the student to obtain the Interim Professional Certificate)

**Second Year**

(7-11) Five approved courses of which at least two must be in Education and at least two in Arts or Science.

(Satisfactory completion of all eleven courses permits the student to apply for the B.Ed. degree)

**Notes on the Program:**

1. Candidates must hold a Journeyman's Certificate or have had preparation and experience recognized by the University as equivalent.
2. Certificated Candidates (Jr. E. or equivalent) will complete items 2, 3, 5, and 6 for the Professional Certificate. To obtain the B.Ed. degree, such candidates will present, in addition, items 7 to 11 (inclusive) of the program.
3. Provision can be made in the program for further specialization in subject fields, guidance and counselling, library services, and the like.
4. Students interested in qualifying for a Masters degree or Graduate Diploma rather than for the B.Ed., following the Professional Certificate year, should consult the appropriate department regarding requirements.

## ADVANCED STUDY IN EDUCATION

**Graduate Diploma Programs in Education**

The Faculty of Education sponsors a series of diploma programs providing additional special qualification in designated areas. Admission to the Graduate Diploma Program will be granted to holders of an approved degree and a Professional (in some Departments the Permanent Professional) Teaching Certificate or its equivalent. Normally, courses taken prior to the 1963 Summer Session may not be credited toward the Diploma unless the student is currently a candidate for the M.Ed. degree. Students who now hold the M.Ed. degree may not obtain the Diploma on the basis of courses taken for that degree. Courses credited toward the Diploma may not also be credited toward the B.Ed. degree. The pass mark for courses to be credited toward the Diploma is a grade 5. Residence requirements for the Diploma may be met in consecutive summer sessions or in a winter session.

Diploma programs are offered by all Departments of the Faculty. Enquiries should be directed to the office of the Department concerned.

When a diploma program has been completed the student must apply to the Dean's office for the diploma on the form provided by the department concerned. Diplomas are not issued until formal application has been made.

**Graduate Degrees in Education**

All candidates for advanced degrees register with the Faculty of Graduate Studies which administers graduate programs throughout the University.

In the Faculty of Education graduate work is offered for the preparation of teachers, supervisors, guidance workers, administrators and other educational specialists, and may lead to the degrees of Master of Education, Doctor of Education and Doctor of Philosophy. Candidates for these advanced degrees specialize in terms of the departmental organization of the Faculty of Education as follows:

*Department of Elementary Education*: curriculum and instruction in kindergarten, primary and elementary education. Head—Dr. A. Kratzmann.

*Department of Secondary Education*: curriculum and instruction in secondary education. (Grades VII-XII). Head—Dr. G. L. Berry.

*Department of Educational Foundations*: philosophy, sociology, and history of education. Head—Dr. B. E. Walker.

*Department of Educational Psychology*: child and adolescent psychology, educational psychology, guidance, mental hygiene, special education, clinical psychology, tests and measurements. Head—Dr. B. R. Corman.

*Department of Educational Administration*: school administration (elementary and secondary), general supervision, school finance and business administraiton, chief administrative roles. Head—Dr. A. W. Reeves.

*Department of Industrial and Vocational Education*: industrial arts and vocational education. Head—Dr. H. R. Ziel.

In order to meet the needs and interests of candidates, the departments permit considerable flexibility in the programs leading to advanced degrees. In general, students pattern their courses from the offerings of the department of their choice supplemented by approved courses from other departments of the University. Normally a candidate for the Masters degree must present a program consisting of six courses and a minor thesis, and is required to spend at least one academic year in study and research in residence at The University of Alberta. A candidate for the Doctors degree (if he already holds a Masters degree) is normally required to spend two academic years in study and research in residence at The University of Alberta.

Graduate courses in education are offered in both the regular and the summer sessions.

**Initial Procedure: Students who wish to inquire about graduate programs should address all preliminary inquiries to the Dean of the Faculty of Graduate Studies, The University of Alberta, Edmonton.**

After a student has decided upon an area of specialization, he should communicate directly wtih the appropriate department head, and if possible, arrange for an interview. By this means the student's eligibility will be determined and further information given about the degree programs available in the Department.

Prospective candidates should also refer to the section of this Calendar which deals with the Faculty of Graduate Studies.

**Special Students**

A student holding a B.Ed. degree or the equivalent and not desiring to register for a graduate degree or not meeting all the requirements for admission to the Faculty of Graduate Studies, may register in the Faculty of Education as a special student.

## LEADERSHIP COURSE FOR SCHOOL PRINCIPALS

A special two-week Leadership Course for School Principals will be held in Concordia College in July.

The course has been developed by the Alberta Trustees' Association, the Alberta Teachers' Association, the Alberta School Inspectors' Association, the Alberta Department of Education, and the Faculty of Education in an effort to improve the quality of leadership at the school level.

It will be a seminar type of activity with the program built around the interests and concerns of the course members. While the course is under the official direction of the Faculty of Education, it will not carry degree credit nor will there be any examinations.

Participation will be limited to 70 experienced principals and vice-principals sponsored by their school boards. The cost per member will be payable by the employing school board. It is expected that course members will live in residence at Concordia College for the two-week period.

Course members will be selected by the end of February. Those interested should consult with their local superintendent and/or school board for further details. Other information as needed may be obtained by writing to The Director, Leadership Course for School Principals, Division of Educational Administration, Faculty of Education, The University of Alberta, Edmonton.

# FACULTY OF GRADUATE STUDIES

The Faculty of Graduate Studies administers programs leading to a variety of graduate degrees. Graduates who have not been accepted as candidates for degrees may register as "qualifying year" or "probationary" graduate students if they are eligible and desirous of seeking admission to candidacy at a later date. "Special" graduate students may also be accepted in the Faculty.

Students proposing to do graduate work in the Summer Session should familiarize themselves with the regulations and procedures set forth in the Calendar of the Faculty of Graduate Studies, which may be obtained from the Registrar. A few of the more important general regulations are given below.

**Admission**

Application for admission to the Facult yof Graduate Studies must be filed not later than April 1 on forms supplied by the Dean of that faculty. A graduate of another University must arrange with the Registrar of that institution to forward two transcripts of his academic record to the Dean of the Faculty of Graduate Studies prior to April 1. The Dean may require the applicant to furnish an official description of the content of the courses listed on the transcript.

**Registration**

An applicant accepted by the Faculty as a candidate or provisional candidate for an advanced degree or as a "qualifying year" or "probationary" graduate student, is required:

(a) before completing registration forms, to consult with the head of the department responsible for his graduate study program regarding his course of studies in the Summer Session. The department concerned will submit a program form to the Faculty of Graduate Studies;

(b) to register not later than April 30 if he proposes to work on his program in the Summer Session;

(c) to maintain continuous registration during his program by registering once a year. This registration entitles students to the use of university facilities and to assistance from their supervisors for a 12-month period. Registration during the final year of the program permits the student to graduate at either of the two following convocations.

A student who fails to maintain continuous registration will be considered to have withdrawn from his program. If he wishes to resume studies on the program, he must apply for readmission to the Faculty of Graduate Studies and have his program reassessed in terms of the regulations in force at the time of reapplication.

**Thesis and Oral Examination**

A candidate planning to graduate at the Fall Convocation must submit his thesis to his examining committee and pass an oral examination sufficiently early in the fall so that the approved and bound thesis is delivered to the office of the Faculty of Graduate Studies not later than Friday, November 8, 1968.

## SUMMER SCHOOL OF LINGUISTICS

The University will conduct a Summer School of Linguistics during the 1968 Summer Session. In so doing, the University recognizes the growing need for linguistically trained scholars, teachers, and governmental personnel. It is expected that the Summer School of Linguistics will be of interest not only to those who wish to embark on or continue a study of Linguistic Science as a major subject but also

(a) to teachers of English and foreign languages in high schools, colleges, and universities who wish to apply to language teaching the methods and results of modern linguistic science;

(b) to advanced undergraduates and graduate students in such fields as English, Modern and Classical Languages, Anthropology, Philosophy, Psychology, and Sociology who may wish to combine the study of Linguistics with their major subject; and

(c) to others such as museum and library staff, civil servants, and missionaries to whom a knowledge of linguistics is of value.

The following courses, described elsewhere in this Calendar will be offered. All of these courses may be taken for University credit.

Education CI 337—Introduction to the Teaching of English as a Second Language

Education CI 339—Methods and Programs in the Teaching of English as a Second Language

English 288 —Introduction to the English Language

Linguistics 305 —Culture and Language

Linguistics 350 —General Linguistics

Linguistics 370 —Contrastive Linguistics: French and English

Linguistics 389 —Modern English Grammar

Linguistics 405 —Applied Linguistics

Linguistics 690 —Models of Language

Regulations concerning admission, registration, fees, pre-session study and examinations are the same as those applicable to other students registered in the Summer Session and may be found in the General Section of this Calendar.

A brochure giving full details concerning the Summer School of Linguistics is available on request from Dr. H. K. Stanford, Associate Director, Summer School of Linguistics, Department of Linguistics, The University of Alberta, Edmonton, Alberta, Canada.

## EVENING CREDIT PROGRAM

Through its Evening Credit Program, The University of Alberta offers credit courses at various centres in Northern Alberta in the evening. The purpose of this program is to enable persons employed during the day either to commence or to continue their university studies. The courses provided are selected primarily to meet the needs of students working towards the following degrees: B.Ed., B.A., B.Com. (first two years only).

In 1968-69 courses probably will be offered at the following centres: Edmonton, Camrose, Evansburg, Grande Prairie, Ponoka, Red Deer, Smoky Lake, Vegreville, Viking, and Westlock.

Information about courses to be offered will be circulated through the schools in the above areas as soon as it comes available.

# DETAILS OF COURSES

**Notes:**

1. The University reserves the right to limit registration in, or to withdraw, any of the courses here outlined.
2. The hours of instruction for both terms of the summer session are shown at the top of each course description. The letter "L" attached to a figure signifies lecture-laboratory-hours, and the letter "s" seminar-hours. Unless otherwise specified, the first figure in each term indicates lecture-hours and the second laboratory-hours.
3. **Only courses marked with an asterisk (*) may be presented for credit on B.A. or B.Sc. degrees.**

## ACCOUNTING

***Acctg 202**—L. S. Rosen (10-8; 0-0)

*Fundamentals of Accounting*—The language of accounting, forms of business organizations, preparation of financial statements.

***Acctg 204**—L. S. Rosen (0-0; 10-8)

*Management Accounting*—Interpretation of financial statements stressing managerial requirements.

Prerequisite: Accounting 202 or equivalent.

## ANTHROPOLOGY

***Anthr 202**—Sally Snyder (10-0; 10-0)

*Introductory Anthropology*—An introduction to the field of anthropology, including human paleontology, race, human prehistory, linguistics and ethnology.

***Anthr 305**—I. E. Davis (10-0; 10-0)

*Culture and Language*—An inquiry into the nature of human communication, its cultural conditions and consequences. Special attention will be given to the interrelations of the linguistic structures and habitual modes of behaviour and thought of various societies.

**Note:** This course is the same as Linguistics 305.

***Anthr 375**—S. M. Piddocke (10-0; 10-0)

*Peoples and Cultures of Africa*—Study of the native cultures with emphasis on the Sub-Saharan part of the continent. Special attention will be given to present day trends of change.

## ART

***Art 230**—J. Moore and Associates (20L; 20L)

*Fundamentals of Design*—The theory and practical application of principles of composition and picture-making, methods of construction in design, and the use of conventional and abstract forms.

***Art 240**—V. Johnson and V. Hammock (20L; 20L)

*Fundamentals of Drawing*—Theory and practice, analysis of masters' drawings; study of line, form, light and shade; portrait and figure construction; life drawing, using both long and quick poses.

***Art 300**—Helen Dow (10-0; 10-0)

*History of European Art, 3rd to 17th Century*—A more detailed study of early Christian, Byzantine, Medieval and Renaissance periods of European Art.

**Note:** In the 1968 Summer Session, this course will be offered only in Rome. For detailed information about transportation, accommodation, etc., students should contact Dr. G. Hermansen, Department of Classics, The University of Alberta, Edmonton.

***Art 340**—R. Sinclair (20L; 20L)

*Advanced Drawing I*—Portrait and life drawing; drawing from memory and visualization; some anatomical drawing; designing from the figure and the draped model in terms of two-dimensional and three-dimensional form; techniques, line, brush, wash, etc.

Prerequisite: Art 240 or written consent of the Department of Art.

**Note:** Consent of Department where required must be filed with registration forms.

***Art 401**—D. Young (10-0; 10-0)

*Twentieth Century Art*—The development of painting, scrulpture and architecture from mid-19th century to present times.

## BIOLOGY

***Biol 130**—J. Hayward and Associates (10-12; 10-12)

*Introductory Biology*—An introduction to biology, with emphasis on principles. Not open to students with credit in Biology 30.

## CHEMISTRY

***Chem 230** (10-12; 10-12)

*Inorganic Chemistry*—Lectures: The fundamental concepts of Chemistry as applied to the elements and their compounds.

Laboratory: The preparation of some compounds; quantitative chemistry.

Prerequisite: Chemistry 130 or Chemistry 30 or equivalent.

## CHRISTIAN THEOLOGY

***Chr 367**—M. Fallona, CSB (10-0; 10-0)

*Introduction to Christian Theology*—An introductory study of the origins and development of Christian theology. Emphasis will be placed on the contributions of Christian writers and theologians to the Christian theological heritage.

## CLASSICS

***Class 350** (10-0; 10-0)

*Classics in English (Greek). Greek Literature and Life*—An historical and critical study of Greek literature in translation from Homer to the end of the ancient world. The social, artistic, and cultural background will be examined. The course will be illustrated from the department's collection of slides, films, photographs and reproductions.

***Class 358** (10-0; 10-0)

*History of the Roman Empire*—A study of the Roman Empire and its rule over the Mediterranean world. Particular attention will be paid to imperial government, law and civilization; to the decline and fall; and to the influence on Byzantine and western European culture.

***Class 459**—G. Hermansen (5-15; 5-15)

*Roman Archaeology and Civilization.* This course is given in Rome. It includes a study of the old city of Rome, with lecturing trips to Etruria, Ostia, Terracina, Palestrina, Tivoli, Pompei, Herculaneum, Cumae and the Green Temples of Paestum. It provides a richer understanding of Latin literature and Roman history and serves as an introduction to advanced studies in Latin literature and Roman history and archaeology.

Prerequisite: Senior standing in Latin, History or Ancient History.

**Note:** For detailed information about transportation, accommodation, etc., students should communicate with Dr. G. Hermansen, Department of Classics, The University of Alberta, Edmonton.

## COMPUTING SCIENCE

***Cmput 310**—H. S. Heaps and D. D. Olesky (10-0; 10-0)

*Elements of Programming*—Structure of computers; instructions, algorithms and programs; languages of computer programming; conventional computers; assemblers and compilers.

***Cmput 411**—J. P. Penny and C. G. Morgan (10-0; 10-0)

*Computer Languages and Their Processors*—Symbolic languages, algebraic languages, problem oriented languages. Table handling methods. Assemblers, interpreters, compilers. Theory of syntax. Syntax-directed translation. Compiler techniques.

Prerequisites: Computing Science 310 or 311, or written consent of the Department of Computing Science.

**Note:** Consent of the Department where required must be filed with registration forms.

## DRAMA

***Drama 240**—A. Francis and Associates (15L; 15L)

*Voice and Speech*—An intensive course in voice and speech improvement with an emphasis upon the oral interpretation of prose, poetry and dramatic literature.

***Drama 250** (20L; 20L)

*Acting Technique and Production*—Practical and theoretical work through improvisation, stage performance and discussion. Emphasis is placed on the development of the actor through preparation for a role, acting scenes, and basic voice and body work.

***Drama 340**—Geraldine Rehrig (15L; 15L)

*Advanced Voice and Speech*—Advanced phonetics and oral interpretation with emphasis upon the actors' speech needs.

Prerequisite: Drama 240.

## ECONOMICS

***Econ 200**—A. A. Warrack (10-0; 10-0)

*Principles of Economics*—A survey of various aspects of economics; the nature of economic problems and systems; the functions of money; commercial and central banking; national income analysis; monetary and fiscal policy; pricing under competitive and monopolistic conditions; selected topics in analysis and policy.

***Econ 310**—R. A. Pendergast, CSB (10-0; 10-0)

*Canadian Economic Development*—The relative growth of various industries and the regional distribution of economic activity with emphasis on the role of export staples, technology, capital accumulation and government.

***Econ 340** (10-0; 10-0)

*Money and Banking*—The principles of money, monetary systems, commercial banking, central banking, monetary theory and policy, foreign exchange.

Prerequisite: Economics 200.

## EDUCATION: Educational Administration

**Ed Adm 462**—J. M. Small (10-0; 10-0)

*The Role of the Teacher*—A basic course in educational administration dealing with topics of special significance to the classroom teacher.

**Ed Adm 464**—E. W. Ratsoy (10-0; 10-0)

*The Role of the Administrator and the Supervisor*—Administrative and supervisory functions of co-ordinative and advisory officers in large schools, and principals in small schools.

Prerequisite: Ed Adm 261, 461, 462 or written consent of Department of Educational Administration..

**Note:** Consent of Department where required must be filed with registration forms.

**Ed Adm 526**—D. Friesen (10-0; 10-0)

*Administration of Educational Personnel*—The supervisory functions of staffing, consulting, and motivating, including such topics as selection and placement, teacher evaluation, in-service training, individual consultation, leadership, teacher morale, use of authority, and organization for supervision.

**Ed Adm 560**—J. J. Bergen (10-0; 10-0)

*Administration of Public Education in Canada*—The legal basis of structure and control. Organizational and operational features of provincial school systems. Current administrative problems.

**Ed Adm 562**—A. W. Reeves (10-0; 10-0)

*Evolving Concepts in Educational Administration*—The development of administrative thought in historical perspective and its implications for educational administration.

**Ed Adm 564**—C. S. Bumbarger (10-0; 10-0)

*Administration of the Educational Program*—An analysis of the tasks of the school district and the school involving the application of administrative and organizational concepts.

**Ed Adm 566**—P. J. Atherton (10-0; 10-0)

*Educational Finance*—Sources of school revenue and analysis of expenditures. Provincial school grants in Canada. The case for federal aid. Plans for equalizing the financial support of public education and major problems involved in their implementation. Principles and practices in the budgeting of school funds. Financial accounting and reporting. Capital expenditures Salary schedules. Cost analysis.

## EDUCATION: Business Education

**Ed Bus 246** (20L; 20L)

*Teaching of Typewriting*—Typewriting, and the teaching of typewriting in the secondary school. Open to students not eligible for admission to Ed Bus 341.

## EDUCATION: Curriculum and Instruction

**Ed CI 331**—H. R. Barnes (10-0; 0-0)

*Introduction to Second Language Teaching in the Elementary School.*

Prerequisite: A teaching certificate and at least one course in French or written consent of the Department of Elementary Education.**

**Note:** Not open to students with credit in Ed CI 336.

**Ed CI 333** (0-0; 10-0)

*The Teaching of French to Native Speakers of French.*

Prerequisite: A teaching certificate and at least one course in French or written consent of the Department of Elementary Education.*

**Note:** Not open to Students with credit in Ed CI 336.

**Ed CI 335**—H. R. Barnes (0-0; 10-0)

*Methods and Programs in the Teaching of French as a Second Language.*

Prerequisite: Ed CI 331 or written consent of the Department of Elementary Education.**

**Note:** Not open to students with credit in Ed CI 336.

**Ed CI 337** (10-0; 0-0)

*Introduction to the Teaching of English as a Second Language.*

Prerequisite: A teaching certificate.

**Note:** Not open to students with credit in Ed CI 340.

**Ed CI 339** (0-0; 10-0)

*Methods and Programs in the Teaching of English as a Second Language.*

Prerequisite: Ed CI 337 or written consent of the Department of Elementary Education.**

**Note:** Not open to students with credit in Ed CI 340.

**Ed CI 345**—Blanche Friderichsen and Glenna Rideout (10-0; 0-0)

*Introduction to School Libraries.*

Prerequisite: A teaching certificate.

**Note:** Not open to students with credit in Ed CI 346.

**Ed CI 347**—Blanche Friderichsen and Glenna Rideout (0-0; 10-0)

*School Library Services.*

Prerequisite: Ed CI 345 or written consent of the Department of Elementary Education.**

**Note:** Not open to students with credit in Ed CI 346.

**Ed CI 361**—K. L. Bowers and D. Burt (10L; 0-0)

*Audiovisual Instruction I*—Theory of audiovisual instruction; types of communications media; principles and techniques of teaching with such media; preparation of selected audiovisual materials; operation and care of specialized equipment.

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**Consent of Department where required must be filed with registration forms.

**Ed CI 363**—K. L. Bowers and D. Burt (0-0; 10L)
*Audiovisual Instruction II*—Selected case studies; experimental and developmental uses of instructional devices; implications for the classroom teacher, the individual learner, class and school organization, and the aims and purposes of education.
Prerequisite: Ed CI 361.

**Ed CI 405**—Elizabeth Mellor (10-0; 0-0)
*Instruction in Elementary School Social Studies.*
Prerequisite: Ed CI 205 or equivalent.
**Note:** Not open to students with credit in Ed CI 406.

**Ed CI 407**—Elizabeth Mellor (0-0; 10-0)
*Curriculum in Elementary School Social Studies.*
Prerequisite: Ed CI 405 and at least one course in social science or history or, written consent of the Department of Elementary Education.**
**Note:** Not open to students with credit in Ed CI 406.

**Ed CI 410**—B. Schwartz (10-0; 10-0)
*Art in the Elementary School.*
Prerequisites: Ed CI 209 or equivalent, and at least one laboratory or studio course in art.

**Ed CI 417**—Jean Robertson and J. T. McBurney (10-0; 0-0)
*The Reading Process: Theory and Observation.*
Prerequisite: A teaching certificate.
**Note:** Not open to students with credit in Ed CI 320 or 322.

**Ed CI 419**—Muriel Affleck (0-0; 10-0)
*Reading in Early Childhood Education.*
Prerequisite: Ed CI 221 or equivalent.
**Note:** Not open to students with credit in Ed CI 320.

**Ed CI 421**—J. T. McBurney (0-0; 10-0)
*Reading in Upper Elementary School.*
Prerequisite: Ed CI 221 or equivalent.
**Note:** Not open to students with credit in Ed CI 322.

**Ed CI 426**—Beverly R. Cutler (10-0; 10-0)
*Curriculum and Instruction in Early Childhood Education.*
**Note:** Not open to students with credit in Ed CI 326.

**Ed CI 427**—K. A. Neufeld (10-0; 0-0)
*Instruction in Elementary School Mathematics.*
Prerequisite: Ed CI 227 or equivalent.
**Note:** Not open to students with credit in Ed CI 428.

**Ed CI 429**—K. A. Neufeld (0-0; 10-0)
*Curriculum in Elementary School Mathematics.*
Prerequisites: Ed CI 427 and at least one course in mathematics or written consent of the Department of Elementary Education.**
**Note:** Not open to students with credit in Ed CI 428.

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**Consent of Department where required must be filed with registration forms.

**Ed CI 431**—N. M. Purvis (10-0; 0-0)
*Instruction in Elementary School Science.*
Prerequisite: Ed CI 231 or equivalent.
**Note:** Not open to students with credit in Ed CI 432.

**Ed CI 433**—N. M. Purvis (0-0; 10-0)
*Curriculum in Elementary School Science.*
Prerequisites: Ed CI 431 and at least one laboratory science course or written consent of the Department of Elementary Education.**
**Note:** Not open to students with credit in Ed CI 432.

**Ed CI 437**—Patricia Lane (10-0; 0-0)
*Instruction in Elementary School Language.*
Prerequisite: Ed CI 237 or equivalent.
**Note:** Not open to students with credit in Ed CI 438.

**Ed CI 439**—Patricia Lane (0-0; 10-0)
*Curriculum in Elementary School Language.*
Prerequisite: Ed CI 237 or equivalent.
**Note:** Not open to students with credit in Ed CI 438.

**Ed CI 446**—K. Knight (10-5; 10-5)
*Selection and Organization of Library Materials.*
Prerequisite: Ed CI 346 or 347 or written consent of the Department of Elementary Education.**

**Ed CI 456**—J. Farrell (10-0; 10-0)
*Advanced Curriculum and Instruction in Secondary School English.*
Prerequisites: Ed CI 254 or 454 or written consent of the Department of Secondary Education.**

**Ed CI 460**—D. V. Parker (10-0; 10-0)
*Advanced Curriculum and Instruction in Secondary School Foreign Languages.*
Prerequisites: Ed CI 258 or 458 or written consent of the Department of Secondary Education.**

**Ed CI 462**—W. R. Dralle (10L; 10L)
*Audiovisual Communication in Teaching and Learning.*
Prerequisite: Ed CI 361.

**Ed CI 476**—M. Riske (10L; 10L)
*Advanced Curriculum and Instruction in Secondary School Biological Sciences.*
Prerequisite: Ed CI 274 or 474 or written consent of the Department of Secondary Education.**

**Ed CI 496**—R. N. MacGregor (20L; 20L)
*Advanced Curriculum and Instruction in the Fine Arts—Art.*
Prerequisite: Written consent of the Department of Secondary Education.**

**Consent of Department where required must be filed with registration forms.

**Ed CI 580**—G. Murphy and W. D. Neal (10-0; 10-0)

*Curriculum Development*—Curriculum research, theory and practice with particular reference to curriculum aims, content, organization, and change.

## EDUCATION: Educational Foundations

**Ed Fdn 414**—R. H. Hughes and L. E. Watson (10-0; 10-0)

*Sociology of the School*—Study of the school as a social institution in the changing society.

†**Ed Fdn 492**—N. C. Bhattacharyya and Associates (10-0; 10-0)

*Philosophy of Education*—A philosophical examination of the logical connection between philosophical theories and recommendations about the aims and practices of education. Attention will be given to the analysis of conceptual problems involved in the understanding and assessment of educational theory and practice.

Prerequisite: Philosophy 240 or 242. For holders of approved degrees other basic philosophy courses may be accepted by the Department.

†**Ed Fdn 496**—D. R. Pugh and Associates (10-0; 10-0)

*History of Educational Thought*—An historical study of the significance of the contributions of thinkers whose intellectual activities have influenced educational theories and practices in the Western World.

Prerequisite: Philosophy 240 or 242. For holders of approved degrees other basic philosophy courses may be accepted by the department.

**Ed Fdn 571**—R. E. Eick (10-0; 0-0)

*Studies of Educational Change in Western Nations.*

**Ed Fdn 573**—R. E. Eick (0-0; 10-0)

*Functions of Education in the Development of Emerging Nations.*

## EDUCATION: Industrial Arts and Vocational Education

**Ed IA 203** (5-0; 5-0)

*Introduction to Industrial Arts*—An examination of past and present theory and practice in industrial arts education.

**Ed IA 260**—C. H. Preitz (10-20; 10-20)

*General Industrial Arts*—Development of basic knowledge and skill in the following: ceramics, electricity, graphic arts, metals, plastics, wood; organization and management of multiple-activity laboratories.

**Note:** This course is designed to prepare industrial arts majors for teaching in grades seven and eight.

**Ed IA 270**—D. W. Manuel (10-20; 10-20)

*Introduction to Technology*—Development of basic knowledge and skills in the following technological areas; computer, electricity-electronics, graphic communications, materials and processes, mechanical, power; organization and management of multiple-activity laboratories.

**Note:** This course is designed to prepare industrial arts majors for teaching in grades eight and nine.

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†Only one of Ed Fdn 492 and 496 may be taken for credit towards a degree.

**Ed IA 370**—M. W. Petruk (20L; 20L)
*Technology I*—Development of competence in computer and electricity electronics technologies.
Prerequisite: Ed IA 270.

**Ed IA 589** (10-0; 0-0)
*Organization of Industrial Arts Education.*

**Ed IA 591** (0-0; 10-0)
*Problems and Trends in Industrial Arts Education.*

**Ed Voc 589** (10-0; 0-0)
*Organization of Vocational Education.*

**Ed Voc 591** (0-0; 10-0)
*Problems and Trends in Vocational Education.*

## EDUCATION: Education Psychology

**Ed Psy 269**—A. Côté (10-0; 0-0)
*Introduction to Educational Psychology: Maturation and Development.*
**Note:** Not open to students with credit in Ed Psy 276.

**Ed Psy 271**—J. C. Powell (0-0; 10-0)
*Introduction to Educational Psychology: Learning.*
**Note:** Not open to students with credit in Ed Psy 276.

**Ed Psy 349**—T. Chambers (10-8; 0-0)
*Psychology and Education of Exceptional Children.*
**Note:** Not open to students with credit in Ed Psy 354.

**Ed Psy 359**—T. Chambers (0-0; 10-0)
*Psychology and Education of the Emotionally Disturbed and Socially Maladjusted.*
Prerequisite: Ed Psy 349 or written consent of the Department of Educational Psychology.

**Notes:**
1. Not open to students with credit in Ed Psy 458.
2. Consent of Department where required must be filed with registration forms.

**Ed Psy 411**—P. Koziey (10-0; 0-0)and(0-0; 10-0)
*Introduction to Guidance.*
Prerequisite: Ed Psy 269 and 271, or 276.
**Note:** Not open to students with credit in Ed Psy 308.

**Ed Psy 469**—J. Bishop and Associates (5-0; 5-0), (10-0; 0-0))and(0-0; 10-0)
*Human Development and Education.*
Prerequisite: Ed Psy 269 or 276.

**Ed Psy 471**—J. C. Powell and Associates (5-0; 5-0), (10-0; 0-0) and (0-0; 10-0)
*Learning and Instruction.*
Prerequisite: Ed Psy 271 or 276.
**Note:** Not open to students with credit in Ed Psy 476.

**Ed Psy 487-489**—V. R. Nyberg (10-0; 10-0)
*Measurement of Educational Objectives and Test Construction for Teachers.*
Prerequisite: Ed Psy 269 and 271, or 276.
**Note:** Not open to students with credit in Ed CI 478.

**Ed Psy 502**—T. Maguire (10-5; 10-5)
*Introduction to Educational Research.*
Prerequisites: Ed Psy 471 and 487, or 476 and 478.

**Ed Psy 504**—R. Gupta (10-5; 10-5)
*Statistics and Research Design in Education.*
Prerequisite: Ed Psy 502.

**Ed Psy 511**—E. Stickel (10-0; 0-0)
*Vocational Development and Choice.*
Prerequisite: Ed Psy 471 or 476.
**Note:** Not open to students with credit in Ed Psy 508.

**Ed Psy 513** (0-0; 10-5)
*Group Assessment in Guidance and Counselling.*
Prerequisite: Ed Psy 487 or 487.
**Note:** Not open to students with credit in Ed Psy 508.

**Ed Psy 569**—G. R. Lefrancois (5-0; 5-0)
*Advanced Educational Psychology: Development.*
Prerequisite: Ed Psy 469.

**Ed Psy 571**—Jean Dyer (5-0; 5-0)
*Advanced Educational Psychology: Learning.*
Prerequisite: Ed Psy 471 or 476.

## ENGLISH

***Engl 200**—G. Willis (10-0; 10-0)
*A Survey of English Literature from Chaucer to the Twentieth Century*—A close study of representative masterpieces. Essays and tests on the prescribed literature will be given to afford practice in setting down ideas in good English.
**Note:** English 200 may not be taken concurrently with another course.

***Engl 210**—D. C. Butler and Associates (10-0; 10-0)
*English Language and Literature*—English 210 is designed to increase appreciation of good literature and to afford practice in setting down ideas in good English.
**Note:** English 210 may not be taken concurrently with another course.

***Engl 288**—N. Parker-Jervis (10-0; 10-0)
*An Introduction to the English Language*—A historical and structural study of the sounds, grammar, and vocabulary of English.

***Engl 332**—I. C. Sowton (10-0; 10-0)
*Shakespeare*—A study of a selection of Shakespeare's plays. Eighteen plays will be discussed, not all in great detail. Among the eighteen will be the following: *Love's Labour's Lost, As You Like It, The Tempest, Troilus and Cressida, Richard III, I Henry IV, Henry V, Romeo and Juliet, Julius Caesar, Antony and Cleopatra, Hamlet, King Lear, Macbeth, Othello.*
Prerequisite: English 200 or 210.

***Engl 356** (10-0; 10-0)

*Poetry and Prose of the Romantic Period*—Selections from Crabbe, Cowper, Burns, Blake, Burke, Wordsworth, Coleridge, Scott, Lamb, Hazlitt, De Quincey, Byron, Shelley, Keats.

Prerequisite: English 200 or 210.

***Engl 364**—R. D. McMaster (10-0; 10-0)

*Poetry of the Victorian Period*—Selected works of Tennyson, Browning, Arnold, Clough, Fitzgerald, Rossetti, Morris, Meredith, F. Thompson, and Swinburne.

**Engl 373**—Lenore Noujaim (10-0; 10-0)

*American Literature to 1900*—A selection of representative major writers to 1900. Emphasis is placed upon the writers of the "American Renaissance", especially Poe, Hawthorne, Emerson, Thoreau, Melville, Whitman, Mark Twain, and Henry James.

Prerequisite: English 200 or 210.

**Note:** Not to be taken by students with credit in English 394.

***Engl 380**—D. S. Thatcher (10-0; 10-0)

*Early Twentieth Century*—Representative plays by Shaw, Wilde, Synge, O'Casey, T. S. Eliot, Auden. Representative novels by Bennett, Wells, Conrad, Forster, Lawrence, Joyce, Woolf, Huxley. Poetry, with particular attention to the work of Hopkins, Yeats, Eliot.

Prerequisite: English 200 or 210.

***Engl 383**—D. Killam (10-0; 10-0)

*American Literature from 1900*—A selection of representative major writers from 1900 to the present.

Prerequisite: English 200 or 210.

**Note:** Not to be taken by students with credit in English 394.

**Engl 398**—Shirley Rose and Eleanor Dobkin (10-0; 10-0)

*Children's Literature*—A historical and critical study of literature written for children with attention to the interaction between children's literature and educational theory. The course will bring to the attention of prospective elementary teachers some of the world's resources in good books for children.

Prerequisite: English 200 or 210.

**Notes:**

1. This course is restricted to B.Ed. students in the Elementary Route.
2. This course may not be presented for degree credit in the Faculties of Arts and Science.

## FRENCH

***Fren 200**—J-P. Laügt (10-5; 10-5)

*First Year University French*—This is an intensive course in spoken and written French. The course includes grammar, composition and literature.

Prerequisite: Grade XII French or French 100.

***Fren 330**—D. Fearon (10-0; 10-0)

*French Language and Civilization*—This course is designed to improve the students' oral and written fluency. It consists of selections from representative

French authors, history of French civilization, oral work in class and in the language laboratory.

Prerequisite: French 200 or 201.

***Fren 340**—M. Kalinowsky (10-0; 10-0)

*Composition and Stylistics*—The development of writing skills through the practice of prose composition. Initiation to the *dissertation.*

Prerequisite or corequisite: French 330.

***Fren 360**—Carla Colter (10-0; 10-0)

*Eighteenth Century*—A study of the literature and the evolution of ideas in the eighteenth century: Fontenelle, Marivaux, Montesquieu, Voltaire, Diderot, Rousseau, Beaumarchais.

Prerequisite: French 350 or written consent of the Department of Romance Languages.**

***Fren 370**—Jeanne Devillers (10-0; 10-0)

*Romantic Period*—A study of the history and development of French romanticism. The poetry and romantic drama of Lamartine, Dumas père, Hugo, Musset and Vigny.

Prerequisite: French 350 or written consent of the Department of Romance Languages.**

**Fren 500**—Mary S. Garfinkle (10-0)

*Special Reading Course*—For graduate students who wish to prepare themselves for the M.A. or Ph.D. language requirement.

**Note:** Auditors will not be admitted to this course.

## GEOGRAPHY

***Geog 201**—N. Pye (10-8; 10-8)

*Physical Geography*—A systematic study of the origin, nature, and distribution of elements of the natural environment. Land forms, weather and climate, vegetation, soil, water, and mineral resources will be related to each other in place. The laboratory work will complement the lectures and will include interpretation, study, and preparation of maps and charts.

**Note:** Geography 201 is classified as a natural science.

***Geog 300**—B. Blouet and D. Lai (10-0; 10-0)

*Human Geography*—The significance of human distribution on the earth. Man's relation to the physical environment; world population problems; cultural patterns in the world; aspects of political and economic geography in selected world trouble areas; racial geography and urban geography. Students planning on taking this course are strongly urged to precede it by Geography 201.

**Note:** Geography 300 is classified as a social science.

***Geog 303**—K. D. Hage (10-0; 10-0)

*Weather and Climate*—A general survey of weather and climate. Weather elements and their observation, the physical processes of weather and their expression in elementary mathematical forms, storms and storm development, regional weather patterns, climatic classification, climatic change, the general

**Consent of Department where required must be filed with registration forms.

circulation, energy exchanges in the atmosphere, and weather modification. Assignments will include analysis of selected weather maps, problems, and interpretation of weather observation and climatic data.

**Note:** Geography 303 is classified as a natural science.

*Geog 412—H. Hoy (10-0; 10-0)

*Latin America*—A survey of the physical features of Middle and South America, followed by consideration of aboriginal peoples, settlement by the Europeans and a regional analysis of the individual countries.

Prerequisite: A course in geography or written consent of the Department of Geography.**

**Note:** Geography 412 is classified as a social science.

*Geog 414—S. I. Smith (10-0; 10-0)

*Africa*—A general survey of the physical geography of the continent, its colonization and resources, followed by detailed regional studies.

Prerequisite: A course in geography or written consent of the Department of Geography.**

**Note:** Geography 414 is classified as a social science.

## GEOLOGY

*Geol 301—D. W. R. Wilson and Associates (10-0; 10-0)

*Earth Science*—History of the development of geology as a natural science; discussion of modern trends in earth science; treatment of selected topics of current interest in physical and historical geology, such as continental drift, glaciation, formation of mountains and ocean basins, geologic time, history of life on the earth; field trips, demonstrations.

**Note:** Not open to students in the Faculty of Science, nor to those who already have credit in Geology 201.

## GERMAN

*Germ 100 (10-8; 10-8)

*Beginners' German*—This course is designed to impart, on the introductory level, an active, practical skill in the use of the spoken and written word. The oral approach will be stressed, using material from everyday-life situations.

**Note:** German 100 may not be taken concurrently with another course.

*Germ 330—J. Whiton (10-0; 10-0)

*German Language and Culture*—A study of German phonology, grammar and style. Lectures and assigned reading on German life, literature and civilization.

Prerequisite: German 200 or written consent of the Department of Germanic Languages.**

Germ 500—E. Egert (10-0; 10-0)

*Special Reading Course*—Specifically designed for graduate students who wish to prepare themselves for the Ph.D. language requirement in German. The course consists of an intensive study of essential grammar, reading of

**Consent of Department where required must be filed with registration forms.

graded texts and translation of texts selected from the students' own fields. Conducted on a tutorial basis.

Graduates who obtain a grade point of 6.0 or better will be considered by the Department as having fulfilled the reading requirement in German for the Ph.D. at The University of Alberta.

Not open to undergraduates nor to auditors.

## GREEK

***Greek 100** (20-0; 20-0)

*Beginners' Greek*—An introductory course to enable students to begin Greek at University. It is concerned with essential grammar and vocubulary, the reading of easy Greek and simple sentences for translation into Greek.

**Note:** Greek 100 may not be taken concurrently with another course.

## HISTORY

***Hist 200**—G. A. Rothrock (10-0; 10-0)

*European History*—The history of Europe from the decline of the Roman Empire in the West to the present.

***Hist 310**—G. A. Burden (10-0; 10-0)

*The Twentieth Century.*

***Hist 355**—Edith Johnston (10-0; 10-0)

*British History Since 1714*—A survey of British History from the accession of George I to the Second World War.

***Hist 360**—Joy Gilsworth (10-0; 10-0)

*American History, 1492-1941.*

***Hist 370**—R. Hett and J. W. Larner (10-0; 10-0)

*Canada*—A survey of the political and social history of Canada.

## HOUSEHOLD ECONOMICS

**HEc 303** (0-0; 10-12)

*Home Management*—Introduction to the principles of home management; application of these principles to the management of time and energy. Selection and arrangement of equipment in the home.

**HEc 307**—Verna Lefebvre (0-0; 10-12)

*Clothing Construction*—Construction techniques applied to specific problems. Evaluation of methods used in present-day clothing construction. Consideration of individual resources, need, skills and management.

Prerequisite: HEc 203, or Fabrics and Dress 20 or 30, or written consent of the School of Household Economics.

**Note:** Consent of School where required must be filed with registration forms.

**HEc 309** (10-12; 0-0)

*Textiles*—A study of (1) natural and man-made fibers, their composition, molecular structure, properties and uses; (2) Yarn and fabric structure, fabric finishes.

**Note:** HEc 309 now replaces HEc 311 as the prerequisite for HEc 411.

**HEc 311** (0-0; 10-0)

*Consumer Textiles*—Interpretation of basic textile information and other factors as they relate to consumer selection, use and care of household textiles; study of soiling and soil removal by wet and dry cleaning methods.

Prerequisite: HEc 309.

**HEc 355**—Grace Cook (10-0; 0-0)

*Family Economics*—Standards of living; family income, savings and expenditures; consumer economics and consumer education.

**HEc 407**—Helen Moseson Samuel (0-0; 10-12)

*Tailoring*—Specialized tailoring techniques applied to the construction of a suit or coat from a commercial pattern. Evaluation of methods used in tailored garments.

Prerequisites: HEc 203 or 307, and HEc 309.

**HEc 455**—Dianne Kieren (10-0; 0-0)

*The Family*—History of the family, the family life cycle and family relationships; research studies in marriage and the family.

## LATIN

***Latin 100** (20-0; 20-0)

*Beginners' Latin*—This course is to enable students who enter the University without Latin to begin the study of this language in university. It is concerned with the essentials of grammar, syntax, the reading of easy Latin and prose composition. A secondary emphasis is placed on the connection of English with Latin.

**Note:** Latin 100 may not be taken concurrently with another course.

***Latin 200** (10-0; 10-0)

*Latin Authors and Prose Composition*—This course is for students with matriculation in Latin 30 or with Latin 100. It is concerned with improvements in the reading of Latin and with the writing of simple Latin sentences.

## LINGUISTICS

***Ling 305**—I. E. Davis (10-0; 10-0)

*Culture and Language*—An inquiry into the nature of human communication, its cultural conditions and consequences. Special attention will be given to the interrelations of the linguistic structures and habitual modes of behaviour and thought of various societies.

**Note:** This course is the same as Anthropology 305 .

***Ling 350**—H. K. Stanford (10-0; 10-0)

*General Linguistics*—An introduction to the study of language in its structural and historical aspects. Examples will be drawn from modern European languages.

***Ling 370**—Jo-Ann Creore (10-0; 10-0)

*Contrastive Linguistics: French and English*—An analytical study of the French and English languages, comparing and contrasting their linguistic struc-

ture, i.e. phonetics, phonemics, morphology, syntactic patterns and lexicology. Practical work in oral recognition and phonetic transcription.

Prerequisites: French 200 and either Linguistics 350 or French 330.

***Ling 389**—P. Luelsdorf (10-0; 10-0)

*Modern English Grammar*—A survey of several approaches to the description of modern English grammar.

**Note:** Students who register in this course are strongly advised to register concurrently in Linguistics 350 if they do not already hold credit in that course.

***Ling 405**—G. D. Waldo (10-0; 10-0)

*Applied Linguistics*—The application of structural linguistics to second language learning, and its relationship to various ancillary areas.

Prerequisite: Linguistics 350.

**Ling 690** (10-0; 10-0)

*Models of Language.*

Prerequisite: Linguistics 455 or written consent of the Department of Germanic Languages and General Linguistics.

**Note:** Consent of Department where required must be filed with registration forms.

## MATHEMATICS

***Math 207**—J. H. Ruscoe (20-0; 20-0)

*Elementary Calculus (Arts and Education)*—Real numbers. Functions and graphs. Differentiation and applications. Analytic geometry. Integration and applications. Trigonometric, exponential and inverse functions.

Prerequisite: Mathematics 30 and 31 or their equivalents.

**Note:** Mathematics 207 may not be taken concurrently with another course.

**Math 264**—W. J. Bruce (10-0; 10-0)

*Foundations of Mathematics*—Axiomatics. Sets and relations. Elementary logic. Classical and modern views of geometry. The number system. Systems of numeration and scales of notation. Measurement.

Prerequisite: Mathematics 30, or written consent of the Department of Mathematics.

**Notes:**

1. This course is restricted to students in the Faculty of Education. It should be of special interest to teachers who may find themselves called upon to teach the new mathematics program in the elementary schools.
2. This course cannot be applied on a major in mathematics.
3. Permission of the Department where required must be filed with registration forms.

***Math 274**—T. Fostvedt and G. Ludwig (10-0; 10-0)

*Algebra*—Logic and sets. Rotation of axes. Linear equations. Vectors, matrices and determinants. Mathematical systems (scales of notation). Mathematical induction. Binomial theorem. The axiomatic approach to the number system. General algebraic systems.

Prerequisite: Mathematics 30.

***Math 374**—S. A. Naimpally and H. Freedman (10-0; 10-0)

*Algebra and Geometry*—Selected topics in projective and other non-Euclidean geometries. Groups, rings, fields. Vector spaces. Lattices and Boolean algebra.

Prerequisite: Mathematics 274 or written consent of the Department of Mathematics.

**Note:** Consent of Department where required must be filed with registration forms.

***Math 404**—T. Rogers (10-0; 10-0)

*Advanced Calculus*—Vector analysis. Ordinary differential equations. Series solutions of differential equations. Gamma, Bessel and Legendre functions. Fourier series. Boundary value problems.

Prerequisite: Mathematics 304 or its equivalent.

(This course is available to Honors Chemistry students and to students in the Mathematics and Physics pattern in the Faculty of Science.)

***Math 424**—Nadkla Al-Salam (10-0; 10-0)

*Algebra and Number Theory*—Fundamental Theorem of Arithmetic. Continued fractions. Linear congruences. Elementary theory of arithmetic functions. Sum of squares. Quadratic reciprocity. Groups, rings, integral domains, fields.

Prerequisite: Mathematics 270 or 271 or 274.

**Note:** This course is recommended for students who have taken the Mathematics 274-374 sequence, although Mathematics 374 is not a prerequisite.

***Math 425** (10-0; 10-0)

*Abstract Algebra I*—Groups, rings, fields. Polynomials, abstract vector spaces. Matrix algebra.

Prerequisite: Mathematics 271 and 306.

**Math 501** (10-0; 10-0)

*Theory of Functions of a Complex Variable*—The complex number system. Complex-valued functions. Convergence of series. Complex integration. Representation theorems. Calculus of residues.

Prerequisites: Mathematics 440 and 426 or written consent of the Department of Mathematics.

**Note:**

1. Only one of Mathematics 500 and 501 may be taken for credit towards a degree.
2. Consent of Department where required must be filed with registration forms.

## MUSIC

***Music 202**—A. B. Crighton (10-5; 10-5)

*Classical and Romantic Music*—Styles and forms from the sons of Bach through early Beethoven. The transition to Romanticism. Forms and styles of the Romantic era. The sonata, symphony, chamber music, opera, lieder, concerto, symphonic poem. The laboratory hours consist of assigned listening, and choral participation.

***Music 213**—A. B. Crighton (15L; 15L)

*Choral Technique and Interpretation*—Elementary theory and practice of singing, choral technique and interpretation. A survey of choral music of all types and of all periods. Elementary conducting. Review of rudiments of musical theory. Preparation of a public concert.

Prerequisite: (a) Western Board of Music Grade III theory or equivalent, and (b) Western Board of Music Grade V practical or equivalent.

## NURSING

**NEd 411**—Shirley Stinson (10-6; 0-0)

*Administration*—An introduction to the basic principles of administration with particular application to Hospital Nursing Service Administration, emphasizing the relationship between administrative practices and improved patient care. Visits to community agencies.

**PH 411**—Betty Harrington (10-6; 0-0)

*Introduction to Public Health Nursing*—Principles of Public Health Nursing; the role of the nurse in Public Health services with emphasis on co-operation between Public Health and hospital services in the community. Visits to community agencies.

## PHARMACY

**Pharm 501**—A. A. Noujaim (5-6; 5-6)

*Isotope Tracer Methodology*—Lectures: A study of the fundamental principles of radioactivity. The importance of radioisotopes in medicine, agriculture, industry and research. Discussion of the problems and limitations in the use of radioisotopes as tracers. Instrumentation and analysis methods. Health and safety precautions.

Laboratory: Handling and preparation of radioisotopes for counting. Counting procedures. Tracer chemical and biochemical analyses.

Prerequisite: A B.Sc. degree in pharmacy, chemistry, agriculture or biology, or written consent of the Faculty of Pharmacy.

**Note:** Consent of Faculty where required must be filed with registration forms.

## PHILOSOPHY

***Phil 240**—G. Price and Associates (10-0; 10-0)

*Introduction to Western Philosophy*—This course is designed to introduce the student to the main problems and theories that have dominated philosophical thought in the Western world, through the study and discussion of selected philosophical classics. Emphasis will be placed both upon a sound acquaintance with the main outlines of our philosophical tradition and upon the ability to handle philosophical ideas independently. To this end both lectures and discussions will form part of the student's training.

***Phil 242**—R. M. Montague, CSB (10-0; 10-0)

*Foundation and Development of Christian Philosophy*—A study of the ideas and main currents of Western Philosophy from its beginnings in the creative period of Greek thought, to achieve an appreciation of the historical roots of

our civilization. Selected ideas and problems will be examined in the writings of significant contributors to this development. Lectures and discussions.

(This course is offered by St. Joseph's College and is accepted as an alternative to Philosophy 240.)

*Phil 250—D. Coder (10-0; 10-0)

*Introduction to Logic*—This course introduces the student to the techniques of both formal and informal logic, and of scientific method; the detection of fallacies in arguments; the notion of validity in deductive arguments, with a discussion of both traditional syllogistic logic and modern symbolic logic; key notions in the logic of science, such as the role of hypothesis formation and experimentation; the nature of scientific explanation and the distinction between inductive and deductive reasoning. The general purpose of the course is to show how to appraise arguments logically.

*Phil 310—M. H. Cohen (10-0; 10-0)

*Philosophy of Civilization*—This course aims at the examination and definition of the concept of civilization. The purpose of such an attempt is twofold: to satisfy the need to comprehend human culture as a whole and to provide a conceptual framework within which national, regional and ideological differences can be discussed rationally.

## PHYSICAL EDUCATION

PE 202—Joyce Boorman (10-10; 10-10)

*Introduction to Elementary School Physical Education*—A study of children at play. Movement education leading to the development of skill in various fields of physical activity.

PE 325—Patricia Austin (10-0; 0-0)

*Scientific Principles of Elementary School Physical Education*—A study of anatomy, physiology of exercise and kinesiology as it relates to the physical growth and development of children aged 6 to 12.

Prerequisite: PE 202.

PE 327—Audrey Carson (0-0; 10-0)

*Dance*—A study of the basic principles of movement and the use of these in the communication of ideas and feelings through dance and dance drama.

Prerequisite: PE 202 or written consent of the Faculty of Physical Education.

**Note:** Consent of Faculty where required must be filed with registration forms.

PE 336—E. B. Mitchelson and Audrey Carson (15L; 15L)

Theory, practice and teaching of archery, badminton, folk and social dance, and tennis.

PE 371—S. Mendryk (10L; 0-0)

*Scientific Bases of Athletic Conditioning and Training*—Theoretical and practical experience in massage, elementary physiotherapy, and preventive techniques.

PE 391—Anne Davidson (0-0; 10-0)

*Health Education in Secondary Schools*—Methods and materials in health instruction.

**PE 548**—R. B. J. Macnab (10-0; 10-0)

*Scientific Principles of Physical Education.*

**PE 567**—S. Mendryk (0-0; 10-0)

*Seminar in Human Motor Performance.*

Prerequisite: Psycho 464.

## PHYSICAL SCIENCE

***PhSc 341**—D. Rankin and G. Roy (10-0; 10-0)

*Physical Science*—A course designed for B.A. and B.Ed. students to give them some appreciation of fundamental ideas and methods in the physical sciences, of modern trends in this field ,and of its relation to other disciplines. Illustrative material will be taken from Physics, Chemistry, Astronomy and Geology, and the history and development of the subject will be stressed.

**Notes:**

1. This course may not be used for credit towards the B.Sc. degree.
2. This course is not open to first year students, and may not be taken for credit by students who have credit in Physics 100 or 200.

## PHYSICS

***Phys 300**—W. C. Olsen (10-6; 10-6)

*Modern Physics (I)*—A study of modern physics emphasizing the development of current theoretical concepts and modern experimental methods. Topics will include: kinetic theory of matter; electromagnetic waves; relativity; nuclear physics; elementary particles; cosmic rays.

Prerequisites: Physics 200 or 340 or 380; Mathematics 180 or 201 or 207.

**Note:** Physics 300 may not be taken concurrently with another course.

## POLITICAL SCIENCE

***Pol S 200**—B. W. Reesor (10-0; 10-0)

*Elements of Political Science*—A study of the principles and practices of modern government, with emphasis on the democratic constitutional state. Among the topics studied are the nature and theory of the state; types of constitutions; the functions and composition of the legislature, executive and judiciary; representation; political parties and pressure groups.

***Pol S 300**—E. P. Murray (10-0; 10-0)

*Comparative Political Systems*—A comparative analysis of selected major political systems of the contemporary world with emphasis on the relationships between political functions and social processes.

**Note:** This course is designed primarily for students who want one senior option in Political Science. Not open to students who are taking or have taken Political Science 200.

***Pol S 320**—J. P. Meekison (10-0; 10-0)

*Government of Canada*—A study of the structure and functioning of the government of Canada, especially of the Commons, the Senate, the Cabinet System, the Civil Service; and the role of political parties.

## PSYCHOLOGY

***Psycho 202** (10-0; 10-0)

*Introduction to General Psychology*—A survey of problems, methods and principles in various fields of psychology.

***Psycho 320** (10-0; 10-0)

*Psychology Applied to Business and Industry*—Methods and results of psychological studies in such fields as: selection, placement, training and supervision of personnel; promotion of efficiency and safety in production; advertising, selling and consumer research.

***Psycho 337**—R. Stretch (0-0; 10-0)

*Individual Differences*—A survey of the biological and social conditions contributing to variations among individuals; methods for describing individuality.

Prerequisite: Psychology 202 or Ed Psy 276, 269 or 271 or written consent of the Department of Psychology.**

***Psycho 353** (10-0; 0-0)

*Developmental Psychology*—A study of behaviour as it is related to normal development and aging.

Prerequisite; Psychology 202 or Ed Psy 276, 269 or 271, or written consent of the Department of Psychology.**

***Psycho 383** (10-0; 0-0)

*Personality*—An introductory survey of the area of personality including a study of representative theoretical points of view and research relevant to the major problems in this area.

Prerequisite: Psychology 202 or Ed Psy 276, 269 or 271, or written consent of the Department of Psychology.**

***Psycho 464**—R. B. Wilberg (10-10; 0-0)

*Motor Skills*—A basic course covering Reaction Time and Motor Learning; the acquisition and perfection of skills and other factors related to Motor Performance.

Prerequisite: Psychology 202 or Ed Psy 276, 269 or 271.

***Psycho 489** (0-0; 10-0)

*Abnormal Psychology*—A general introduction to abnormal psychology.

Prerequisite: Psychology 202 or Ed Psy 276, 269 or 271, and Psychology 383; or written consent of the Department of Psychology.**

## SOCIOLOGY

***Soc 202**—W. Meloff and Associates (10-0; 10-0)

*Introductory Sociology*—An introductory analysis of the nature of society, the interrelationships of its component groups, and the processes whereby society persists and changes. Society is analysed in terms of its structure, culture and social ranking schemes. The interrelationship between the various institutions (e.g. family, church, school, government) are considered. The processes are examined whereby the individual is socialized into society, as are the sources of conformist and non-conformist behavior.

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**Consent of Department where required must be filed with registration forms.

***Soc 325-327**—S. Fisher (10-0; 10-0)

*Criminology, Penology and Correction*—A critical examination of the meaning and attempted explanation of crime and juvenile delinquency, with an analysis of the social processes leading to criminal behavior. The evolution and evaluation of the theories of punishment, the law and the courts, penal and reformatory institutions, probation and parole, a consideration of the various experiments in reform and rehabilitation.

Prerequisite: One previous course in sociology or written consent of the Department of Sociology.**

***Soc 325-329**—M. Erickson (10-0; 10-0)

*Criminology and Juvenile Delinquency*—A critical examination of the meaning and attempted explanation of crime and juvenile delinquency, with an analysis of the social processes leading to criminal behaviour. Analysis of juvenile delinquency and its relation to adult crime, the social processes involved in the genesis and perceptions of styles of delinquency and their relationships to the community, and to various current theories of prevention and control, including the role of institutions and law.

Prerequisite: One previous course in sociology or written consent of the Department of Sociology.**

***Soc 370**—K. R. Cunningham and Associates (10-0; 10-0)

*The Family*—Structure and functions of the family, comparative family systems, sociology of family life stages (such as childhood, adolescence, adulthood, old age), contemporary trends and problems of the family.

***Soc 430**—D. Whiteside (10-0; 10-0)

*History of Sociological Thought*—The historical roots of sociology, beginnings of modern sociology, and development of sociological theory to present times.

Prerequisite: Sociology 202, 402 or 403 or written consent of the Department of Sociology.**

***Soc 464-465**—E. W. Noland (10-0; 10-0)

*Sociology of Work and Formal Organization*—A study of the nature, meaning and functions of work in historical and cross-cultural content. Analysis of the nature and implications of formal organizations, including theories and studies of bureaucracy.

Prerequisite: Sociology 202, 402 or 403 or written consent of the Department of Sociology.**

## SPANISH

***Span 100** (10-8; 10-8)

*Beginners' Spanish*—A first course in Spanish grammar and pronunciation; an introduction to Spanish and Hispano-American civilization.

**Note:** Spanish 100 may not be taken concurrently with another course.

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**Consent of Department where required must be filed with registration forms.

## STATISTICS

***Stat 255**—J. Hubert (10-12; 10-12)

*Elementary Statistics*—Graphs, tables, diagrams. Frequency distributions, averages, dispersion, moments. Elementary probability. Binomial, normal and Poisson distributions. Sampling. Regression and correlation. Significance tests. Applications to data in various fields.

Prerequisite: Mathematics 30.

**Note:** Statistics 255 may not be taken concurrently with another course.

## UKRAINIAN

***Ukr 300**—T. Carlton (10-0; 10-0)

*Second Year Ukrainian*—Thorough review of elementary Ukrainian grammar, advanced grammar, composition, and oral practice based on selected texts of Ukrainian classical and contemporary literature.

Prerequisite: Ukrainian 100 or written consent of the Department of Slavonic Languages.**

## ZOOLOGY

***Zool 411**—C. Devillers (0-0; 10-12)

*Embryology*—The sequence of normal development is presented and the underlying mechanisms are analyzed.

Prerequisite: Zoology 300 or 320 or written consent of the Department of Zoology.**

***Zool 462**—D. A. Boag (10-12; 0-0)

*Animal Ecology*—The ecological principles governing the reciprocal relationships between animals and their environments.

Prerequisites: Biology 230 and a senior course in zoology or written consent of the Department of Zoology.**

**Consent of Department where required must be filed with registration forms.

# TIMETABLES—LECTURES AND LABORATORIES

## SECTION I—FULL-SESSION COURSES

(July 2—August 13)

### Schedule of Lecture Periods

| 8:00 a.m. to 10:00 a.m. | 10:15 a.m. to 12:15 p.m. | 1:30 p.m. to 3:30 p.m. |
|---|---|---|
| Anthro 375 | Anthro 202 | Art 230 (1:30-5:30) |
| Art 240 (8:00-12:00) | Anthro 305 | Class 358 |
| Art 340 (8:00-12:00) | Art 401 | Cmput 310 |
| *Biol 130 | *Chem 230 | Drama 240 (1:30-4:30) |
| Cmput 411 | Chr 367 | Drama 250 (1:30-5:30) |
| Econ 340 | Class 350 | Drama 340 (1:30-4:30) |
| Ed Adm 464 | Econ 310 | Econ 200 |
| Ed Adm 526 | Ed Adm 562 | Ed Adm 462 |
| Ed Adm 560 | Ed Adm 564 | Ed Adm 566 |
| *Ed CI 446 | Ed CI 426 | Ed Bus 246 (1:30-5:30) |
| Ed CI 460 | Ed CI 456 | Ed CI 410 |
| Ed CI 476 | Ed CI 462 | Ed CI 496 (1:30-5:30) |
| Ed IA 203 (8:00-8:55) | Ed Fdn 492 | Ed CI 580 |
| Ed Psy 469: Sect. C (8:00-8:55) | Ed Fdn 496 | Ed Fdn 414 |
| *Ed Psy 502 | *Ed IA 260 | Ed IA 370 (1:30-5:30) |
| Ed Psy 571 (8:00-8:55) | *Ed IA 270 | Ed Psy 487-489 |
| Engl 288 | Ed Psy 471: Sect. C (10:15-11:10) | *Ed Psy 504 |
| Engl 364 | Ed Psy 569 (10:15-11:10) | Engl 210 |
| Engl 383 | Engl 200 | Engl 332 |
| Fren 330 | Engl 373 | Engl 398 |
| Fren 370 | Engl 380 | Engl 356 |
| Geog 303 | Fren 340 | *Fren 200 |
| Geog 414 | Fren 360 | Fren 500 |
| *Germ 100 | *Geog 201 | Geog 300 |
| †Greek 100 | Geog 412 | Geol 301 |
| Hist 310 | Germ 330 | Germ 500 |
| Hist 360 | Hist 200 | †Greek 100 |
| †Latin 100 | Hist 355 | Hist 370 |
| Ling 350 | Ling 305 | †Latin 100 |
| Ling 405 | Math 274 | Latin 200 |
| Ling 690 | Math 424 | Ling 370 |
| †Math 207 | Math 425 | Ling 389 |
| Math 264 | *Pharm 501 (10:15-11:10) | †Math 207 |
| Math 404 | Phil 310 | Math 374 |
| *Music 202 | *PE 202 | Math 501 |
| Phil 250 | PhSc 341 | Music 213 (1:30-4:30) |
| PE 548 | *Phys 300 | Phil 240 |
| Pol S 200 | Psyco 202 | Phil 242 |
| Pol S 300 | Soc 370 | PE 336 (1:30-4:30) |
| Psyco 320 | Soc 430 | Pol S 320 |
| Soc 202 | *Stat 255 | Soc 325-327 |
| Soc 464-465 | | Soc 325-329 |
| *Span 100 | | |
| Ukr 300 | | |

### Schedule of Laboratory Periods

Biol 130—1:30-4:30 p.m., MTWTh.
Chem 230—1:30-4:30 p.m., MTWTh.
Ed CI 446—Sect. 01—1:30-2:30 p.m., daily.
Sect. 02—2:30-3:30 p.m., daily.
Ed IA 260—1:30-5:30 p.m., daily.
Ed IA 270—1:30-5:30 p.m., daily.
Ed Psy 502—10:15-11:15 a.m., daily.
Ed Psy 504—3:45-4:45 p.m., daily.
Fren 200—3:45-4:45 p.m., daily.
Geog 201—1:30-3:30 p.m., MTWTh.
Germ 100—1:30-3:30 p.m., MTWTh.
Music 202—5 hours per week to be arranged.
Pharm 501—1:30-4:30 p.m., MW or TTh.
PE 202—1:30-3:30 p.m., daily.
Phys 300—1:30-4:30 p.m., MW.
Span 100—1:30-3:30 p.m., MTWTh.
Stat 255—1:30-4:30 p.m., MTWTh.

*Consult also the Schedule of Laboratory Periods.
†The classes in Greek 100, Latin 100 and Mathematics 207 meet twice daily, 8-10 a.m. and 1:30-3:30 p.m.

## SECTION II—FIRST-TERM COURSES

(July 2—July 22)

### Schedule of Lecture Periods

| 8:00 a.m. to 10:00 a.m. | 10:15 a.m. to 12:15 p.m. | 1:30 p.m. to 3:30 p.m. |
|---|---|---|
| *Acctg 202 | Ed CI 337 | Ed CI 335 |
| Ed CI 361: Sect. 01 | Ed CI 345 | Ed CI 331 |
| Ed CI 405 | Ed CI 427 | Ed CI 361: Sect. 02 |
| Ed CI 431 | Ed IA 589 | Ed CI 417 |
| Ed CI 437 | Ed Psy 411: Sect. A | *Ed Psy 349 |
| Ed Fdn 571 | Ed Voc 589 | Ed Psy 511 |
| Ed Psy 269 | HEc 455 | Psycho 353 |
| Ed Psy 469: Sect. A | *NE 411 | *Psycho 464 |
| Ed Psy 471: Sect. A | PE 371 | |
| *HEc 309 | *PH 411 | |
| HEc 355 | Psyco 383 | |
| PE 325 | *Zoo 462 | |

### Schedule of Laboratory Periods

Acctg 202—10:15 a.m. to 12:15 p.m., daily.
Ed Psy 349—8 hours per week to be arranged.
HEc 309—1:30-4:30 p.m., MTWTh.
NE 411—6 hours per week to be arranged.
PH 411—6 hours per week to be arranged.
Psycho 464—3:45-5:45 p.m., daily.
Zoo 462—1:30-4:30 p.m., MTWTh.

## SECTION III—SECOND-TERM COURSES

(July 24—August 13)

### Schedule of Lecture Periods

| 8:00 a.m .to 10:00 a.m. | 10:15 a.m. to 12:15 p.m. | 1:30 p.m. to 3:30 p.m. |
|---|---|---|
| *Acctg 204 | Ed CI 339 | Ed CI 333 |
| Ed CI 363: Sect. 01 | Ed CI 347 | Ed CI 335 |
| Ed CI 407 | Ed CI 429 | Ed CI 363: Sect. 02 |
| Ed CI 433 | Ed IA 591 | Ed CI 419 |
| Ed CI 439 | Ed Psy 411: Sect. B | Ed CI 421 |
| Ed Fdn 573 | Ed Voc 591 | Ed Psy 359 |
| Ed Psy 271 | HEc 311 | *Ed Psy 513 |
| Ed Psy 469: Sect. B | *HEc 407 | PE 567 |
| Ed Psy 471: Sect. B | PE 391 | Psycho 337 |
| *HEc 303 | Psyco 489 | |
| *HEc 307 | *Zoo 411 | |
| PE 327 | | |

### Secdule of Laboratory Periods

Acctg 204—10:15 a.m.-12:15 p.m., daily.
Ed Psy 513—3:45-4:45 p.m., daily.
HEc 303—1:30-4:30 p.m., MTWTh.
HEc 307—1:30-4:30 p.m., MTWTh.
HEc 407—1:30-4:30 p.m., MTWTh.
Zoo 411—1:30-4:30 p.m., MTWTh.

*Consult also the Schedule of Laboratory Periods.

# TIMETABLES—FINAL EXAMINATIONS

## SECTION I—FIRST-TERM COURSES

| Classes Meeting at | Final Examinations |
|---|---|
| 8:00 a.m. | Tuesday, July 23, 8:00 a.m. |
| 10:15 a.m. | Tuesday, July 23, 12:00 noon |
| 1:30 p.m. | Tuesday, July 23, 4:00 p.m. |

## SECTION II—FULL-SESSION AND SECOND-TERM COURSES

| Classes Meeting at | Final Examinations |
|---|---|
| 8:00 a.m. | Wednesday, August 14, 9:00 a.m. |
| 10:15 a.m. | Wednesday, August 14, 2:00 p.m. |
| 1:30 p.m. | Thursday, August 15, 9:00 a.m. |

## ACADEMIC STAFF

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WILSON, D. W. R., BSc PhD, Assistant Professor of Secondary Education.
WILLIS, G. D., BA MA, Lecturer in English.

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## TEXTBOOK ORDER FORM

### Summer Session, 1968

From .....

Address .....

.....

**To: The Bookstore,**
**The Universtiy of Alberta,**
**Edmonton, Alberta.**

**Please forward the following books, C.O.D.:**

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|---|---|
| | |

**Do not send payment with orders.**

# Office Directory

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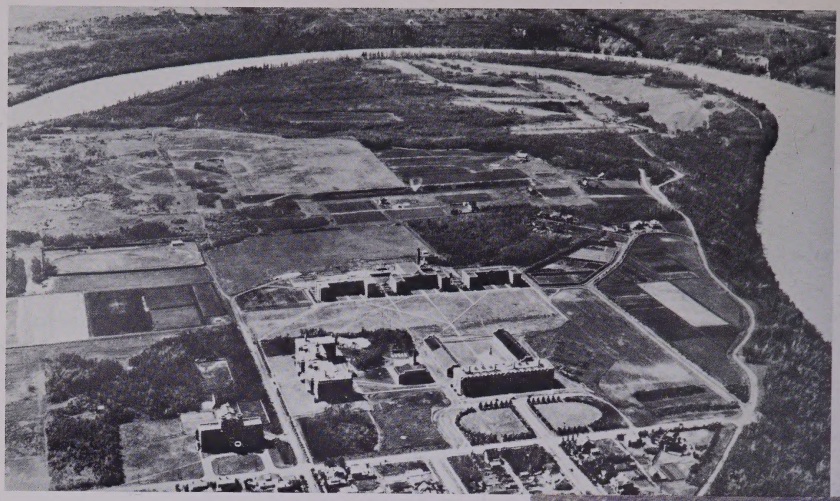
| The University of Alberta (PBX) | | 432-3111 |
| Summer Session | Education | 432-3752 |
| Faculties and Schools | | |
| Arts | Arts | 432-4221 |
| Science | Physics-Computing Science | 432-4757 |
| Education | Education | 432-3759 |
| Graduate Studies | Administration | 432-3499 |
| Bus. Adm. and Com. | H. M. Tory | 432-4347 |
| Physical Education | Physical Education | 432-3365 |
| Pharmacy | Medical Sciences | 432-3362 |
| Household Economics | Household Economics | 432-3824 |
| Nursing | Corbett Hall | 439-7357 |
| Registrar's Office | Administration | 432-4754 |
| Student Counselling | Students' Union | 432-3772 |
| Dean of Women | Pembina Hall | 432-3216 |
| Dean of Men | Students' Union | 432-3483 |
| Infirmary | Health Services | 439-4991 |
| Housing | Lister Hall | 439-4921 |
| Canada Manpower Centre, Student Placement Service | Students' Union | 432-4291 |

**A directory of University buildings and departments will be found on page 66 of this Calendar.**



## A BRIEF HISTORY OF SUMMER SESSION

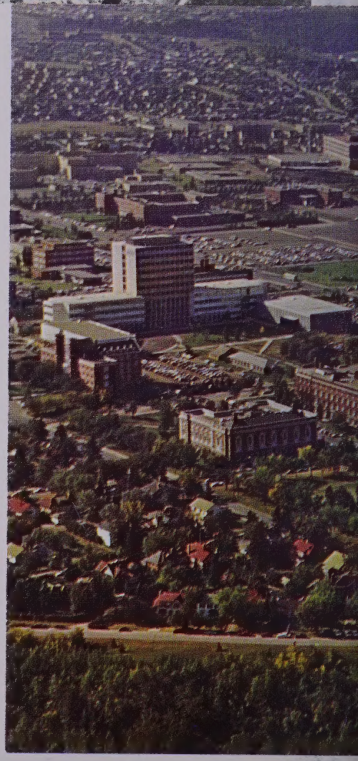
1921—Dean Kerr reported to the General Faculty Council:

"Two years ago, by an arrangement with the Provincial Department of Education, a few courses were informally offered during the summer under the Faculty of Arts & Sciences. There were 17 or 18 students. The work gradually increased, and in the second summer there were 35 students, and this year there were 75".

1923—The Dean of Arts & Science reported to the Senate:

"Edmonton has a charming summer climate and as we return by degrees to normalcy again it is highly probable that the summer session will develop in importance."

1968—4200 students are expected to attend the Summer Session.



An aerial view of
The University of Alberta Campus
Edmonton

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